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Aeroplane

Volume 39

Part 2

1930

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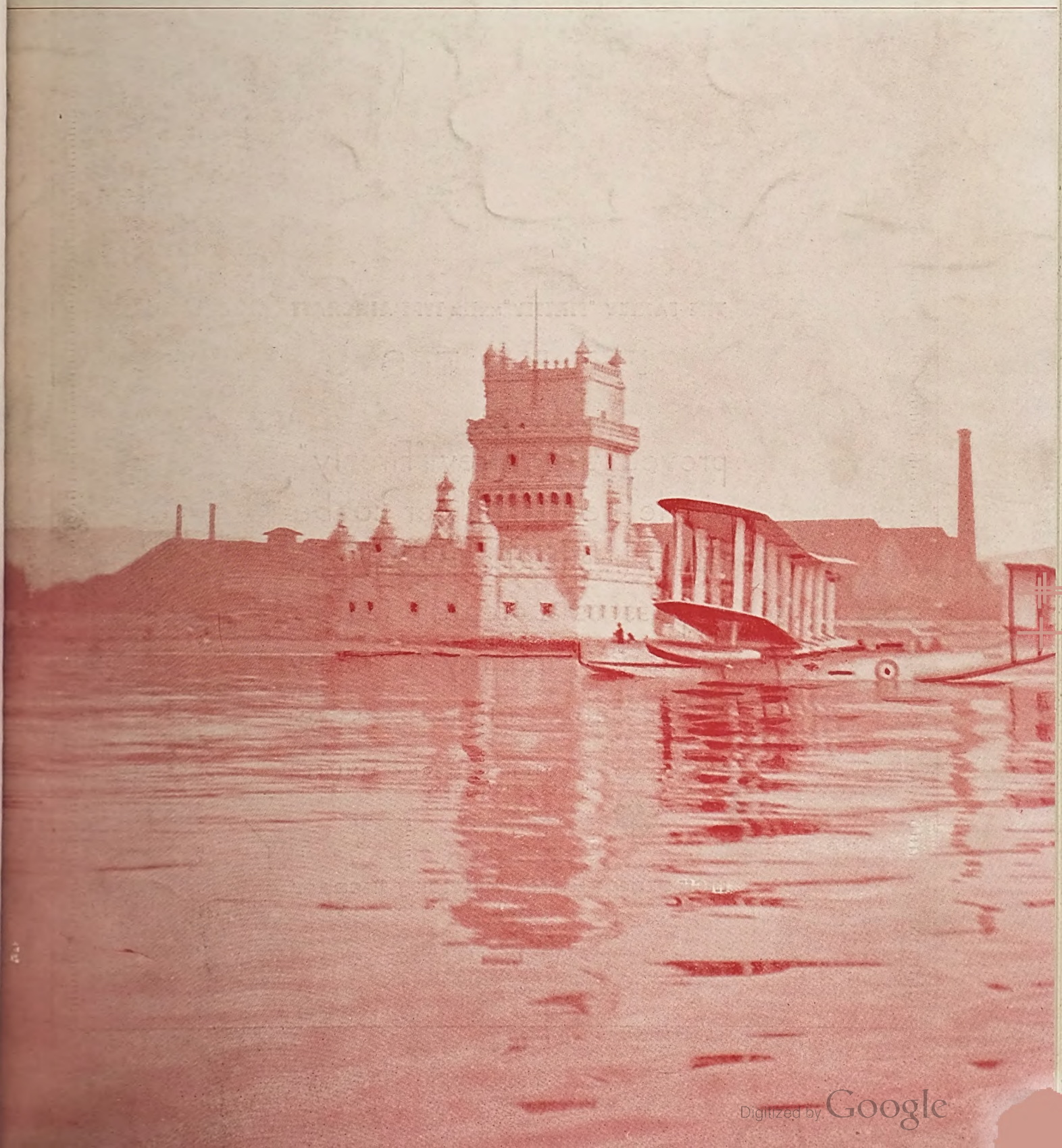
# THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey



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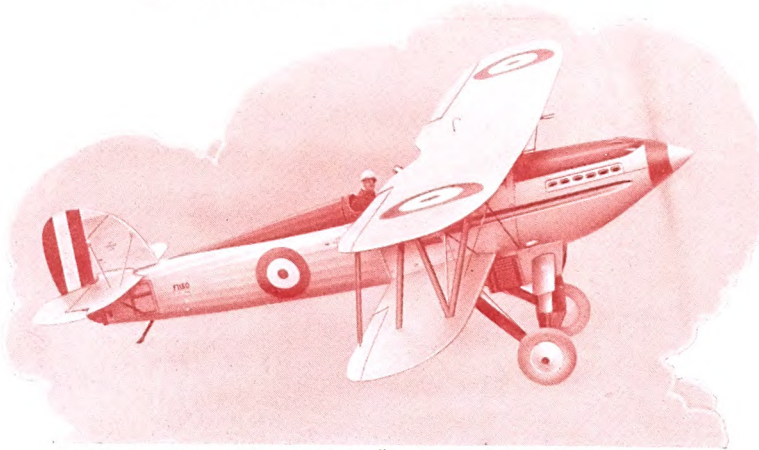
# THE WORLD'S FASTEST FIGHTER



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To-day we are starting to produce between half a dozen and a dozen types of passenger-carrying aeroplanes which, if only we could build up confidence in flying, ought to sell quite largely to the well-to-do people of this country and of the British Empire. But to induce those well-to-do people to buy them we must build up confidence in flying as a means of transport. And the only way of building up that confidence is to explain how aircraft accidents really happen.

### Barriers to the Truth.

When we come down to plain basic facts the two things which are the greatest drawback to the progess of aviation in this particular way are the old sentimental theory that no evil must be spoken of the dead, that awful old tag—*De mortuis nil nisi bonum,* which to-day might be retranslated into *De mortuis nil nisi bunkum*—and, secondly, fear of the Law of Libel.

Over and over again, the Technical people of the Air Ministry have been quite certain that fatal accidents have happened through aeroplanes breaking in the air. But they have just lacked the evidence that would satisfy a Court of Law. Therefore, they have been forced to refrain from telling what they conscientiously knew to be true.

Added to this there has been very often and quite justly the feeling that although a certain aeroplane has broken in the air the makers of the aeroplane are conscientious engineers who have done their best, not only so far as they knew themselves but so far as scientifical knowledge as a whole went, to build a thoroughly airworthy aeroplane. And those who are responsible for the issue of official reports have felt that by telling what they knew to be the truth openly they would be damaging a firm which did not deserve to be harmed.

Now this is an entirely praiseworthy attitude. But at the same time it is one which may do more harm than good. The reputation of Aviation as a whole and of the whole Aircraft Industry suffers because those in authority endeavour to protect one firm.

Surely more good would be done if the firm itself accepted the ruling of the authorities, published the explanation of the accident itself and then published at the same time a definite statement that the fault which caused the accident had been found and that such an accident could not possibly happen again.

### Cases In Point.

There are several actual cases in point. A year or two ago a certain type of aeroplane, built by one of the most reliable and conscientious of aircraft firms, developed a habit of trying to shake its wings off. Whether anyone was actually killed through the wings shaking off I do not profess to know, and if I did know I should probably not say, but the fact is that for months and months the reputation of that firm suffered because of gossip in the R.A.F. and out of it about this wing trouble. And when a method of securing the wings was discovered by quite a simple process of balancing the ailerons no public statement was issued. All that happened was that quite a long time afterwards some scientific person read a very serious paper to an audience of possibly a dozen people at the Royal Aeronautical Society on Wing Flutter.

I am inclined to think that if as soon as the cause of wing flutter had been discovered the firm itself, or possibly the Society of British Aircraft Constructors, had issued a manifesto to the Press, saying that yet another possible cause of accidents to aircraft had been discovered and remedied, and that therefore flying in future would be that much safer, not only would the harm done have been undone but a good advertisement would have been given to flying as a whole.

That is only one small example of how the policy of publicity can do far more good than trying to hide away a defect. And one suggests to the new Department of Information of the Society of British Aircraft Instructors, that it might pay attention to such matters.

Yet another instance of this kind concerns a type of aeroplane which in its class is undoubtedly one of the best in the World. The first of the type passed all possible tests with flying colours. Others were built of exactly the same design and construction. One broke in the air under an extreme test and killed a well-known foreign aviator. Two others showed signs of breaking but fortunately did not kill anyone because the pilots got away in parachutes.

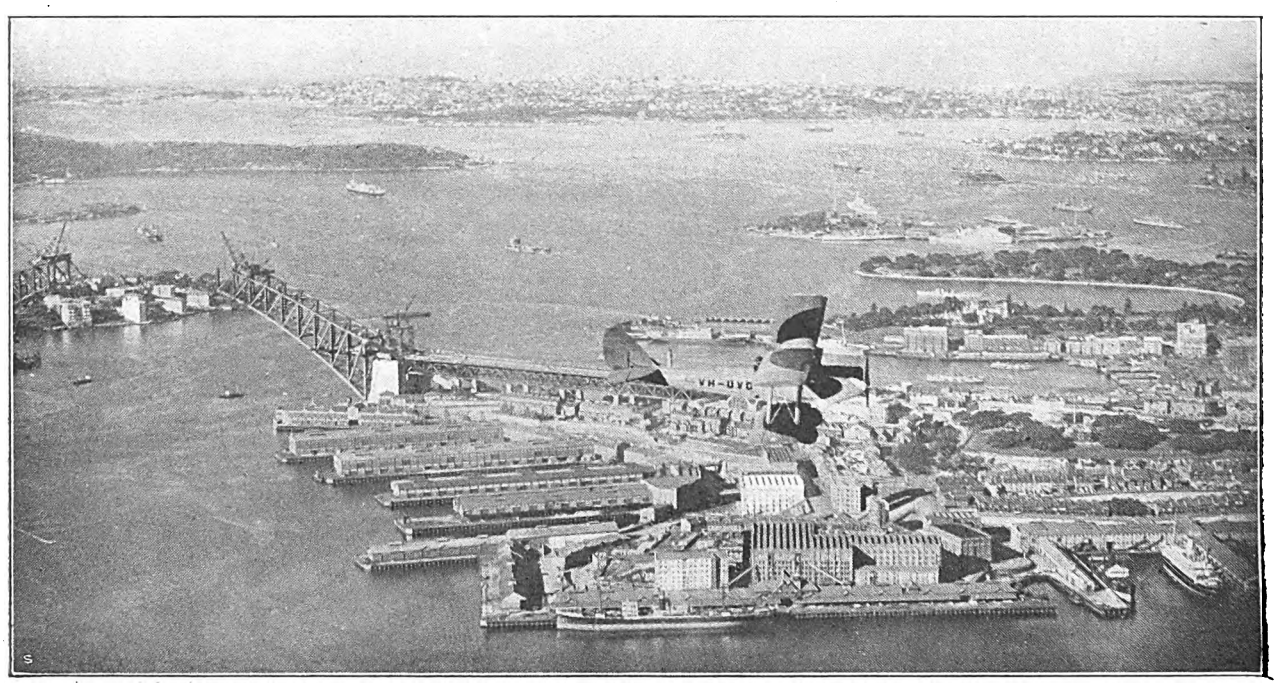
Thanks to these two other accidents the trouble was discovered. It was a small thing which never could have been discovered by calculations, and the part which gave way could only give way under extreme flying conditions. But it has been discovered and it cannot break again.

Probably all the technical people at the Air Ministry know what the trouble was and that it has been cured. Possibly some of the more technically-minded flying officers in the Air Force know. And possibly the technical people of the nation to which the dead aviator belonged also know, now. But the great majority of people who heard of that accident and the very considerable number who also heard of the minor accidents when nobody was killed, have never been told what was the matter and have never been told that the defect has been cured.

That I believe to be bad policy. At any rate in one foreign country where valiant efforts are being made to sell that particular aeroplane, competitive firms, chiefly French, have got at the local Press and have started a regular scare campaign about letting the aviators of that nation fly on what they call "a death trap" or a "murder plane." And what those papers say must necessarily be spread throughout the neighbouring countries.

A full and complete explanation of the whole business in all the aviation papers of the British Empire and in the British Engineering papers, would probably undo most of the harm which is being done.

Those are only two examples, which can be multiplied over and over again. And one does suggest quite seriously to The Society of British Aircraft Constructors that when such accidents do occur manifestoes should be issued by the Society as a whole. Or failing that, the firms themselves who have been unfortunate enough to discover defects in their products would do well to advertise the fact that these defects have been discovered and that their aeroplanes, or engines, or what-nots, are thereby so much safer than they were before.




**A GATEWAY TO PROSPERITY.—The Gipsy-Moth "Plume" belonging to the Vacuum Oil Co. Pty. Ltd. flying over Sydney Harbour. The big bridge in the left background is now joined.**

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**On SEA**—The World's record speed for single-engined motor boats, the Championship of the World. Championship of Germany and Championship of Europe, were secured by the late Sir Henry Segrave driving his Napier-engined Miss England.

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THE PERSONAL ELEMENT.

Those suggestions only deal with the reputations of individual firms. What really concerns us still more is the good repute of flying as a whole. And here we are actually up against a much more difficult problem. For every aviator who has been killed during the last five years through defects in the design or construction of his aeroplane I have no hesitation in saying that ten have been killed through their own foolishness.

Now that is a hard thing to say and it is harder still on the friends and relatives of those who have been killed. In the Royal Air Force occasionally a definite statement is made that a pilot has been killed through "an error of judgment." That, more times than not, is a euphemism for sheer foolishness or silly recklessness. But sentiment prevents anybody from saying it outright.

Moreover, when somebody who knows explains, even in conversation, precisely how somebody has been killed through the foolishness or clumsiness or sheer carelessness of the pilot, somebody is pretty sure to get up and say—"Oh, yes, you are interested in the Aircraft Trade and the best way to save the reputation of the maker of the aeroplane is to blame the pilot. He's dead and can't answer back."

Now that is a difficult argument to answer. Practically everywhere in the World, if you appeal to sentiment in the right kind of way you can absolutely destroy common sense or logic. And when you impute low commercial motives to anybody who makes a plain statement of that sort the answer is still more difficult. But unless somebody tells the truth the progress of aviation is bound to suffer.

We are between the Devil and the Deep Sea when we try to decide whether we are going to tell the truth and be condemned either as heartless wretches or as low commercial libellers of the dead, or whether we are going to keep our mouths shut and pretend that every aviator is a dead hero and has been killed by either bad workmanship or by sudden unknown dangers inherent in flying.

Young and reckless flyers do all sorts of things which ought to be severely punished and are not. The number of complaints that have been made not only of Service pilots but also of civilian pilots flying low down at seaside places for the fun of making people duck when they are bathing is far greater than it ought to be. Nobody happens to have been killed that way yet, but a good many pilots have killed themselves through trying to do very much the same sort of thing on land.

There was, for example, one mysterious fatal accident in which the small amount of evidence available pointed to the fact that two pilots in one aeroplane had flown down low onto, or alongside, a train and then had stalled when zooming up again. Their wrecked machine was found near the railway, and barring the fact that somebody had seen them dip down suddenly towards the railway line and shoot up again, there was absolutely nothing to show what caused their death. To label them a couple of reckless fools would certainly be unfair under the circumstances. But if the fact that people could be killed in such a way was made more widely known, it might at any rate do something to allay the idea that flying is so dangerous.

And what would be said of anybody who deliberately asserted in print that a pilot and his passenger were killed because they were both drunk at the time, and that everybody at the aerodrome from which they had started knew that they were drunk, and that obviously they were both playing the fool in the air and brought the machine to the ground and killed themselves?

Or what would be said if anybody asserted that a pilot who had earned himself a bad reputation in another country as a heavy-handed, clumsy, awkward pilot, who barely managed to get a licence to carry passengers for fee or reward in that country, left that country because he could not get a job on account of his clumsiness, came over here, was given a job, took a machine with passengers into a cloud, got into a nose-dive in the cloud, came out suddenly nearer to the ground than he expected, pulled the machine up with a jerk, pulled the wings off and killed himself and his passengers?

A definite assertion of such facts, even though the person who made the assertion was quite sure of the facts, would result in his being held up as libelling the dead, or alternatively, saving the reputation of the makers or owners of the machine at the expense of the dead pilot.

SHOOTING-UP.

One of the favourite pastimes of the young and light-hearted aviator is what he or she calls "shooting up" somebody or something. That consists in diving down at the object till so close to it that anybody looking on thinks the machine is bound to hit it, and then zooming up again after having scared the life out of the people on the ground, or the inexperienced passenger in the aeroplane.

I have known people do it to friends' cars on the road and when the aviator happens to pick out the wrong car, and scares somebody who does not know what he is playing at, the result is bad for aviation.

Even in the Air Force such things are done. A light-hearted pilot may shoot up a party of friends walking across the aerodrome, or he may shoot up people in a boat that he happens to know, or again he may shoot up a Service car on the road.

There is a story of a pilot who recognising his own Commanding Officer's car, dived down on it, very nearly touched it with his wheels, zoomed up again, and in the course of the zoom started a roll, got onto his back, failed to complete the roll, dived head first to the ground, and was killed only a few hundred yards away from the car.

Now there quite distinctly is a case where the Air Ministry should announce, for the good of everybody concerned and for the good repute of the Service, that this unfortunate and foolish young man was killed definitely through his own foolishness. To call such an accident "an error of judgment" may be kind to the relatives of the deceased officer, but it carries with it to the ordinary person a clear indication that an aeroplane is such a dangerous thing that people are continually being killed through misjudging something which is dreadfully difficult to judge. And something definitely should be done to remove this impression that judgment in handling an aeroplane is so difficult.

Supposing for example two men are so foolish as to give an exhibition of shooting (such as has been done often enough) in which one puts an apple on the top of his head and the other shoots it off from a distance of thirty or forty yards, and the man with the rifle commits an error of judgment and puts the bullet through his friend's head, he would scarcely be acquitted in a Court of Law on the grounds that he had committed an error of judgment. And yet that is precisely on a level with the kind of error of judgment by which a very large number of pilots, both in the Air Force and out of it, are killed.

The fact that they kill themselves does not matter, in one way, because it removes from among us people who are obviously devoid of common sense. But the public, who are still inclined to think that anybody who flies is by nature a hero, only regard such a death as a loss to the nation. And the still worse trouble is that so often the pilot who kills himself by his own foolishness, has a passenger with him who is killed at the same time.

THE NEED FOR AN ANSWER.

The most difficult problem of all is, what are we going to do about it? Will the Air Ministry evolve some formula other than the words "An error of judgment," to indicate whether a deceased aviator was definitely playing the fool at the time he was killed or not? And will they be heartless enough to tell the world quite plainly when a man has been killed by his own foolishness?

Naturally the more severely Service-like people will say that whether a Service pilot is killed or not is no business of the general public. That in a way is true enough. Even in the days when Cavalry were more numerous than they are now, the papers made little fuss when a cavalry-man fell off and was ridden over by his troop. And they said very little when an artillery-man fell off a limber and was run over by his own gun or by the gun that was following. In those days the soldier was a mere mercenary brute and nobody cared very much whether he was killed or not. We need a War before Tommy Atkins becomes a hero.

But flying is still too much in the public eye to adopt an attitude of complete indifference about the number of aviators who are killed in a year. The newspapers keep a more or less inaccurate tally of the number of pilots in the Air Force who are killed every year. And they take a delight in comparing the deaths of this year with the deaths of last year and of the year before, up to the same date.

That is all part of the journalistic game. But if the Air Ministry would definitely issue some figures saying how many of those people last year were killed through their own foolishness and how many through dangers inherent in flying, and would compare those figures with the previous year and with the current year, something might be done to bring the danger of flying into the right perspective in the eyes of the public.

SOMETHING TO WATCH.

We are promised a report from the Committee of Experts which is now sitting on the unfortunate accident at Meopham in Kent where two pilots and four passengers were killed. That report will make very interesting reading. Some of us know almost certainly already just what was the cause of that accident. But to see whether the experts will come to the same conclusion, and whether, if they do, they will have the courage to publish exactly what they find, will be very interesting indeed.

One thing can be said quite definitely now about that. It was not due to any defect in the aeroplane and it was not due to any danger inherent in flying, any more than in any other form of transport. It was an accident which might quite easily have been avoided. But until some bigger and more sensational accident happens to eclipse that particular accident in the imagination of the public,

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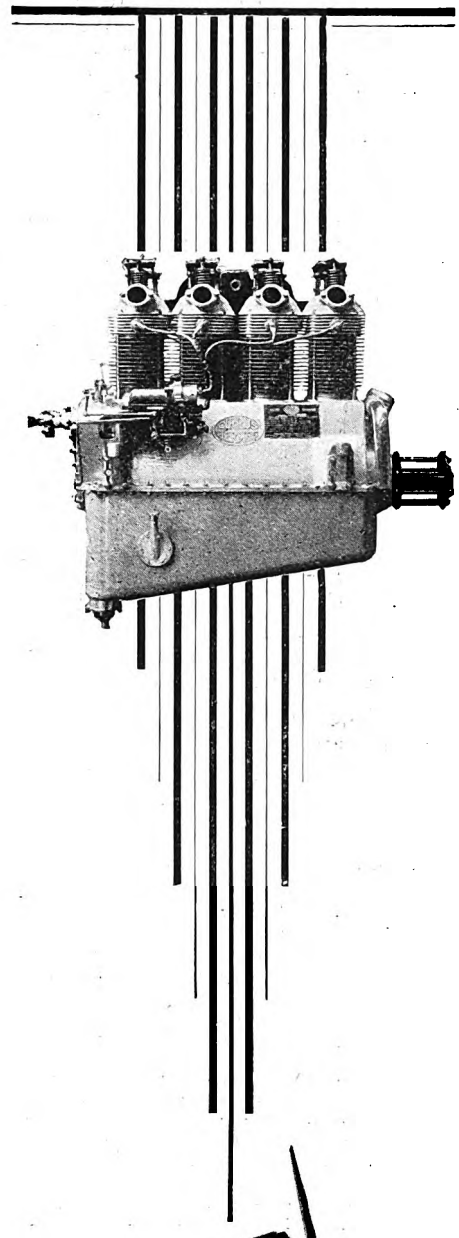
# CIRRUS HERMES



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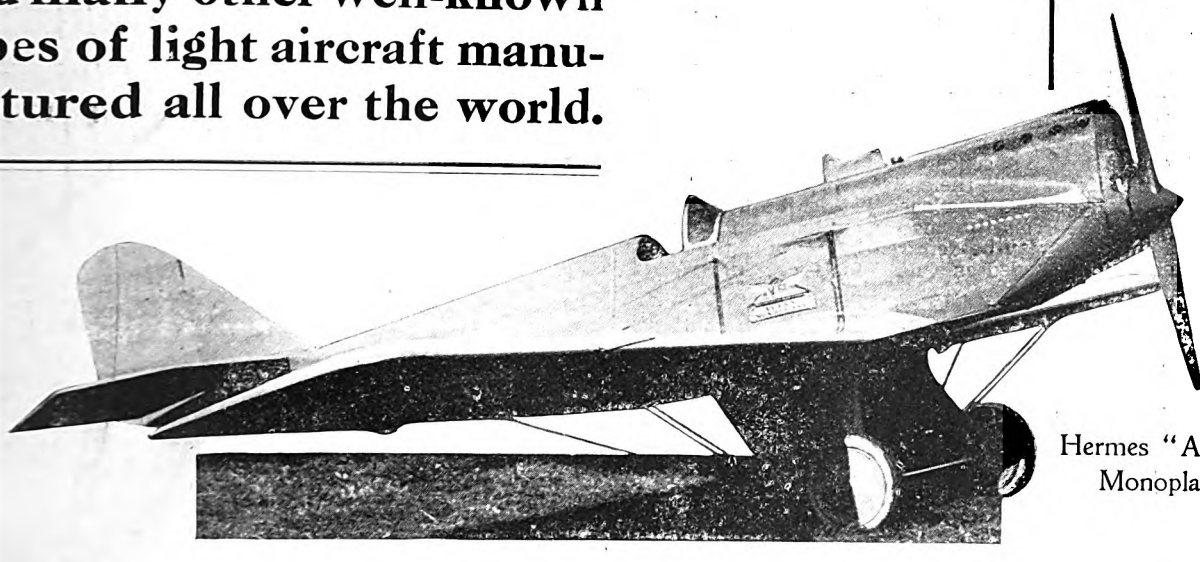

Hermes "Avian" Monoplane.

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it will be held up continuously as an illustration of the danger which is inseparable from flying.

No doubt some day we shall be up against the same difficulties in flying that we are against in motoring to-day. That is to say that there will be too much legislation, and the people who have to administer that legislation will work on the wrong assumptions.

For example, although practically every magistrate on every bench either drives a car or has a car in which he is driven, fast driving is still supposed by the police and by most benches of magistrates, and by the general press to be the cause of most motor accidents. As a matter of actual fact very few accidents happen because of fast driving. Much more often they happen because of slow driving, when the driver's attention is wandering in a way which he cannot afford when he is driving fast. And accidents hardly ever happen to habitually fast drivers who are driving first-class cars in first-class condition.

Somewhat similarly in flying, very few accidents happen to first-class pilots flying fast machines and flying them properly. Still fewer fatal accidents happen through any defect in the aeroplane or in the engine. By far the greater number of accidents are caused by sheer carelessness or stupidity or clumsiness on the part of the pilot.

In Civil Aviation the kind of accident which is most likely to be fatal, at any rate where air liners are concerned, is when a pilot tries to push through bad weather without proper knowledge of what lies ahead of him and unjustifiably risks the life of his passengers merely for the kudos of getting through when somebody else might not get through; or because he is afraid of losing his job for not getting through when others have done so.

The average air line pilot in these days is so experienced that he is not likely to have an accident through the common cause of stalling his machine and diving to the ground, or even stalling when getting off or landing, as happens quite frequently to less experienced pilots.

Actually the risk inherent in flying, either through possible breakage of machines or engine or through unavoidable circumstances, such as bad weather or anything of that kind, are extremely small.

The risk of collision in the air to-day is a great deal higher than it should be, because the great majority of the aeroplanes built to-day were built as they are for some reason best known to their designers, and they all give a very much worse view forward and upward than they should do. That is apparently the greatest risk of all unavoidable accidents, and that is perhaps the one risk which can most easily be cured by designers and constructors.

In certain machines it has been reduced by using inverted engines. In others it has been reduced still further by using two engines instead of one. But apart from that the real unavoidable risks in flying are very small.

On the other hand, the risk of being killed through the sheer foolishness or ignorance of the pilot is very large, except on the better class air lines. And that is why personally I do so little flying. When I see the way quite experienced pilots behave I marvel more and more not that so many people are killed flying but that so extraordinarily few are killed. By far the best way of curing this sort of thing is for the Air Ministry and whatever other authorities may be concerned to make the pilots understand that if they kill themselves through their own carelessness the facts will be placed before the World as clearly as possible. Even the man who longs to be regarded as a live hero may be deterred by knowing that he is more likely to be branded as a dead fool.—C. G. G.

## THREE OUT—WITHOUT GAS.

An aeroplane in which three Americans were attempting a non-stop flight from New York to Buenos Aires as an advertisement for toothpaste came to grief on July 16. The smiles which are usually employed to advertise such commodities seem to have come off during the journey by reason of the crew's omission to "guard danger line." They had intended to refill, in the air, but the ministering aircraft failed to put in an appearance, the dental enthusiasts came to the end of their gas supply and crashed at Bostwick, Georgia. At least, the occupants took to their parachutes, and abandoned the machine which now, presumably, lies flat on the bush.

## WHAT AMERICA THINKS.

The following editorial remarks are extracted from *The Aviation News* of Sept. 20, 1930:—

The light-plane, low-horse-power fad has struck Italy. Pilots of that country took first and second place in the recently-conducted Tour of Italy. A German finished third and an English woman finished fourth.

These all-European contests strike our fancy. They must bring out some interesting comparisons in design. It might be rather a good idea to invite foreign competition in the 1931 National Air Tour. And for us to enter European tours.

## THE ROYAL AERONAUTICAL SOCIETY.

The Inaugural Lecture of the 66th Annual Session of the Royal Aeronautical Society will be delivered by Mr. C. R. Fairey, M.B.E., F.R.Ae.S., President 1930-31, in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m., on Thursday, Oct. 9. The subject of the Lecture will be "The Growth of Aviation," and will be a review of the technical and commercial progress which has been made during the last twelve years.

## THE SECOND AERIAL BEAGLE MEET.

The Pipewell Beagles and the Northamptonshire Aero Club are holding the second Annual Aerial Beagle Meet at Sywell Aerodrome on Saturday, Oct. 11.

Invitations are being sent to the Club's many flying friends. Will anyone who does not receive an invitation and who would like to fly down, write to Mr. G. Linnell, Wilby House, Wellingborough?

The Northampton Club hope that most of the visitors will stay and join in the second Aerial Treasure Hunt which the Club is arranging for Sunday morning, Oct. 12.

## THE FIRST ITALIAN HEAVY-OIL ENGINE.

Some time ago The Aeroplane stated that a flight had been made from Turin to Rome in a Fiat aeroplane with a Fiat heavy-oil engine. Some details of the engine which was then used by Signor Donati are now available.

This engine is known as the Fiat A.N.1 and is a six-cylinder in-line water-cooled engine which develops 180 h.p. at 1,600 r.p.m. and has a maximum horse-power of 200 at 1,700 r.p.m. The consumption is 190 gm. per brake horse-power-hour. The specific gravity of the fuel used is .86. The mean effective pressure is given as 7 kgs. per sq. cm. (99.5 lbs. per sq. in.)

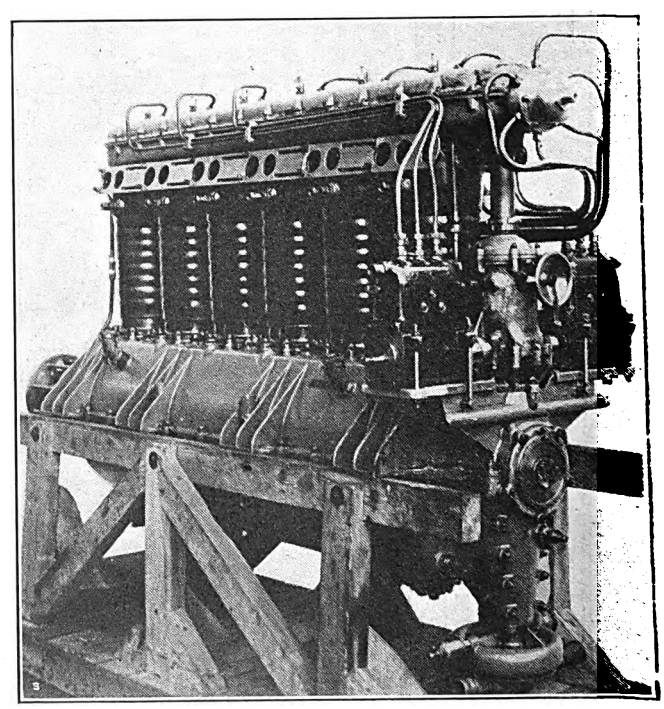
The engine is still in the experimental state and has been built up from suitably modified parts of the A.12 bis. engine. The steel cylinders are of 140 mm. bore and have a stroke of 180 mm. The water-jackets of sheet-steel are welded onto the cylinder. The cylinder-heads are of aluminium and are designed to ensure turbulence. The pistons are also made of aluminium. Presumably aluminium here means suitable alloys of that metal.

Two camshafts run along the heads of the cylinders and work the valves. There are two inlet and two exhaust valves per cylinder. The inlet valves are directly open to the atmosphere.

The injector nozzle is in the middle of each cylinder head. The fuel to these is supplied by pumps at the rear of the engine, and each cylinder has its own pump. The pumps are arranged in sets of three. The amount of fuel injected and the time taken to do this can be varied and forms the "throttle" mechanism.

The engine is started by compressed air which is conveyed to each cylinder through non-return valves, and a distributor is used to supply the air in the right order to each cylinder.

As yet no British heavy-oil engine has taken the air.



**The First Italian Heavy-Oil Engine.**

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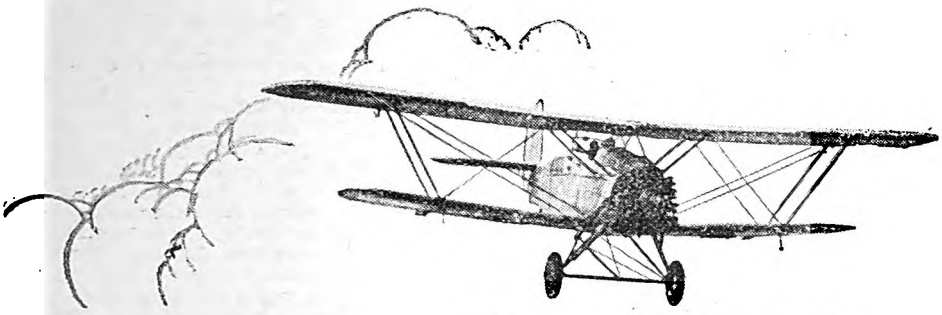

# The ATLAS

## PICKING UP MESSAGES

*Applications of the Atlas*

THE Armstrong Whitworth Steel Atlas fitted with Armstrong Siddeley Jaguar engine is the standard two-seater aircraft for Army co-operation. It is also used for :—

1. Artillery observation.
2. Photography
3. Bombing
4. Picking up messages
5. Reconnaissance
6. Advanced training.

The Atlas aircraft is produced in the best equipped aircraft factory in the British Empire.

SIR W. G.

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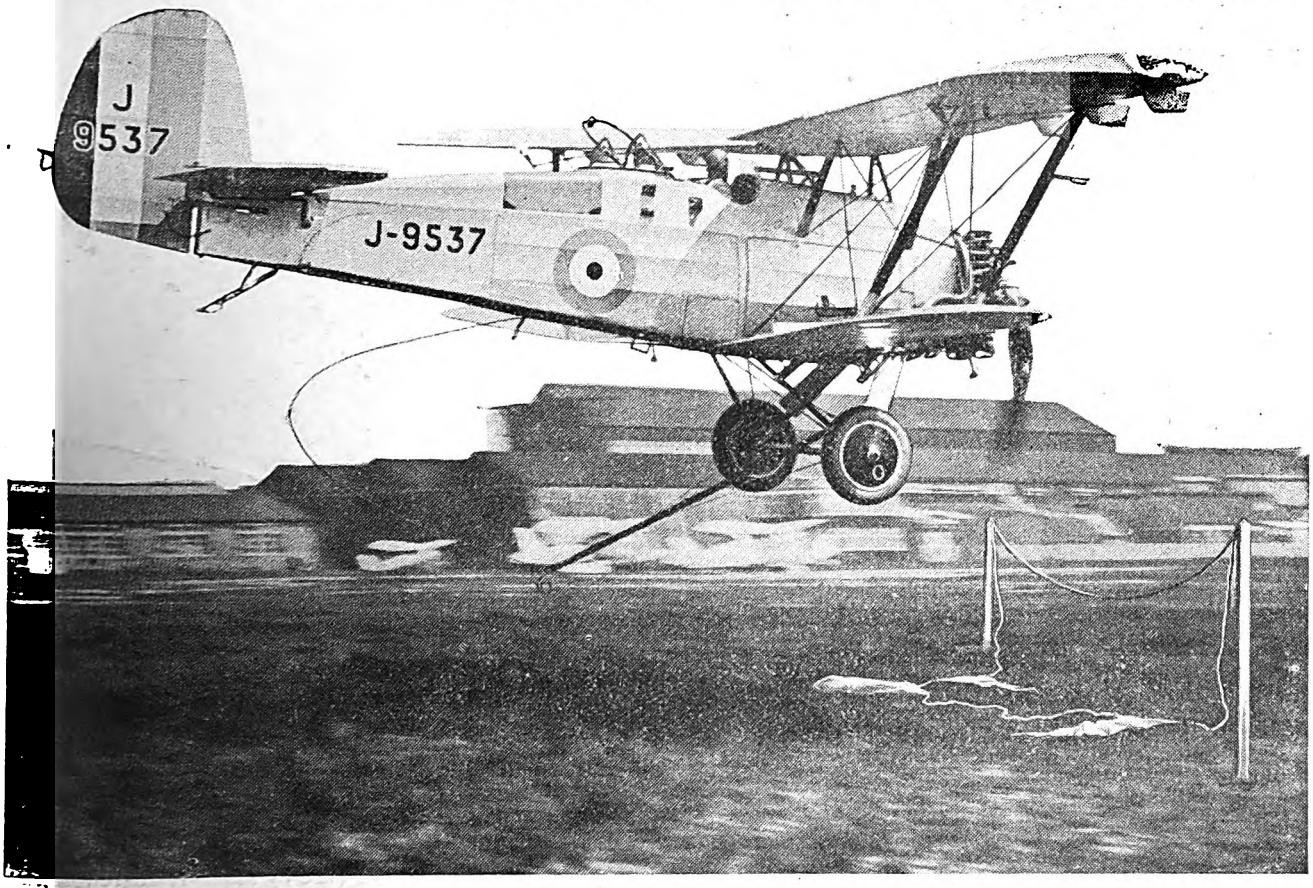





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## HOMAGE TO SPORTSMANSHIP.

On Sept. 25 the Royal Aero Club gave a lunch at the Savoy to the British Representatives in the recent competitions on the Continent. With them was joined Mr. Charles Barnard, on account of his excellent work for British aviation in his flight to Malta in a day and back again in another day, and to Tangier also in one day and back in a day.

Unfortunately, Mr. and Mrs. Alan Butler and Mr. Hubert Broad and Mr. Carberry and Mr. (Spartan) Andrews were away on holidays, and so the British Representatives in the Continental Competitions narrowed down to Miss Winifred Spooner, Mr. Thorn of Cirrus Aero Engines Ltd., and the Honourable Lady Bailey.

The Right Honourable Sir Philip Sassoon, Chairman of the Royal Aero Club, presided, which was really very kindly of him considering that he was leaving for America next day. And the chiefs of most of the important firms in the Aircraft Industry were also present.

After lunch Sir Philip Sassoon proposed the toast of the guests of honour. He referred particularly to Miss Spooner and Mr. Barnard. Miss Spooner had arrived some twenty minutes late through having been misinformed about the place of the feast. And as some of the more important guests indicated that they were compelled to keep appointments the party sat down to lunch. So she and the fish arrived simultaneously. Sir Philip commented on this fact, and said that he believed the reason for Miss Spooner being late was that she had on this occasion abandoned air transport, in which she was always absolutely up to time, for the old-fashioned methods of ground transport. Perhaps one may be forgiven for interpolating here the remark that this was probably the first occasion on which Miss Spooner, with her skill in navigation, has come in on the wrong course.

Continuing, Sir Philip reminded us how in the great International Tour of Europe Miss Spooner had upheld the honour of British airmanship, and of British aircraft construction. Her performance had not only filled the people of this country but all the aeronautical people on the Continent with admiration.

Referring then to Mr. Barnard, he said that his flights to Malta and Tangier in one day had been even more striking evidence of the possibilities of air transport than had his flight with the Duchess of Bedford to India and back and to the Cape and back.

In conclusion Sir Philip said that one of the pleasing duties of the day was to present to Miss Spooner the handsome trophy which stood in front of him, which had been presented to the Royal Aero Club by the Imperial Tobacco Company, to be held by the British competitor who scored highest marks in the general classification in the International Tour. It had been won by Miss Spooner and certainly nobody could have deserved it better. He congratulated Mr. Earl of the Imperial Tobacco Company on the fact that his company had seen fit to present this trophy. The presentation showed that the firm was up-to-date and cognisant of the help which air transport could give to trade. Seeing that ladies contributed so largely to the prosperity of the Imperial Tobacco Co., the fact that the trophy was won by a lady was all the more appropriate.

Mr. Handley Page, supporting the toast, remarked that this was a very nice family party. We were all able to meet on such an occasion as this without mutual recriminations. He was particularly pleased to see among us his old friend Mr. Stanley Spooner, who would no doubt rejoice at seeing his family name made still more famous in aviation by Miss Winifred Spooner. [Here one may remark that our good friend Mr. Stanley Spooner is no relation to Miss Spooner.]

Mr. Handley Page said how pleased he was to see ladies taking a greater and greater part in the executive work of the World. He found, from his own experience, that there was so much difficulty in getting women in these days to do ordinary domestic work that he looked forward to the time when women would be doing all the executive work, and men could stop at home and do such easy things as housework.

Becoming serious, he referred to the marvellous performance of Miss Spooner, and added that when we were talking of flying we could hardly mention the word without thinking or speaking of the Honourable Lady Bailey.

So far as Mr. Barnard was concerned, he said that he was like the famous Cheshire Cat in *Alice in Wonderland*. He was here to-day and gone to-morrow. One had a drink with him in the Aero Club, and the next day one heard that he was in Malta, and the following evening he was back again in the Aero Club for another drink. Nobody, Mr. Handley Page said, had done so much to demonstrate the possibilities of civil aviation as Mr. Barnard, with perhaps the exception of Sir Sefton Brancker, our Director of Civil aviation. Such feats as we were celebrating showed definitely that Britain was not in a decline.

He also referred kindly to the latest addition to The Aeroplane, and remarked that he was glad to see that there was a prospect of this paper continuing in yet another generation to agitate for the progress of British Aviation.

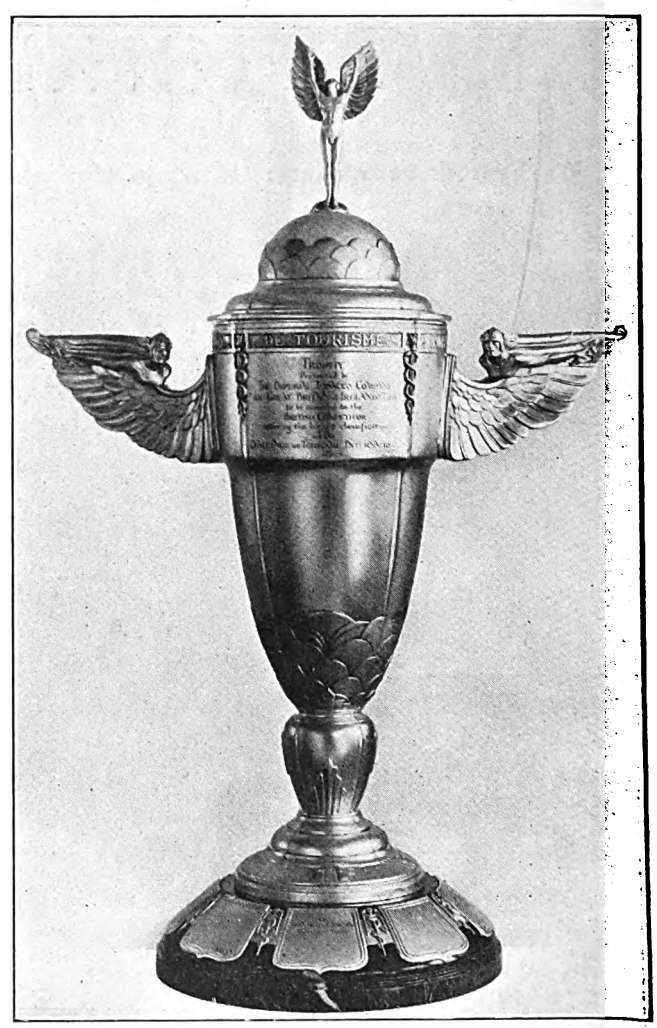
Mr. Earl of the Imperial Tobacco Company said that he had been asked by his Chairman, Lord Dulverton, to express his regret that a long-standing previous appointment prevented him from being present. Mr. Earl said that he hoped to see Britain come out top in the next International Tour. British entries for International Competitions would be of immense value to our prestige in future. He congratulated Squadron Leader the Right Honourable F. E. Guest on having entered the aeroplane in which Miss Spooner did so well. He then presented to Miss Spooner a small replica of the Challenge Trophy.

Miss Spooner, replying, thanked everybody concerned for the encouragement which had been given to her, especially Sir Sefton Brancker. She regretted that she was not to take the Challenge Trophy home with her as well as the replica, because she said she was sure she could keep it much cleaner in her own home than it would be kept at the Aero Club. [The suggestion was made after lunch that Miss Spooner should be appointed Honorary Cleaner of Trophies to the Royal Aero Club. It was not received with enthusiasm.]

Mr. Charles Barnard stated his definite opinion that Miss Spooner was the finest woman pilot in the World,—a remark which met with general approval. He said that everybody appreciated her marvellous performance. He said that he himself hoped to start on a flight to Australia early in October. And he said that Wing Commander Kingsford-Smith was also going to attempt the flight.

Sir Francis McClean then thanked Sir Philip Sassoon for taking the chair and said that we were all honoured by the presence of Miss Spooner and Mr. Barnard.

Sir Philip Sassoon having replied gracefully, the meeting broke up, and one learned afterwards that after all Miss Spooner is to be allowed to take the cup home, which seems very right and proper.—C. G. G.




**THE IMPERIAL TOBACCO CO.'S CHALLENGE CUP.—Won for the first time by Miss Winifred Spooner for her fine flying in the "Challenge de Tourisme International."**

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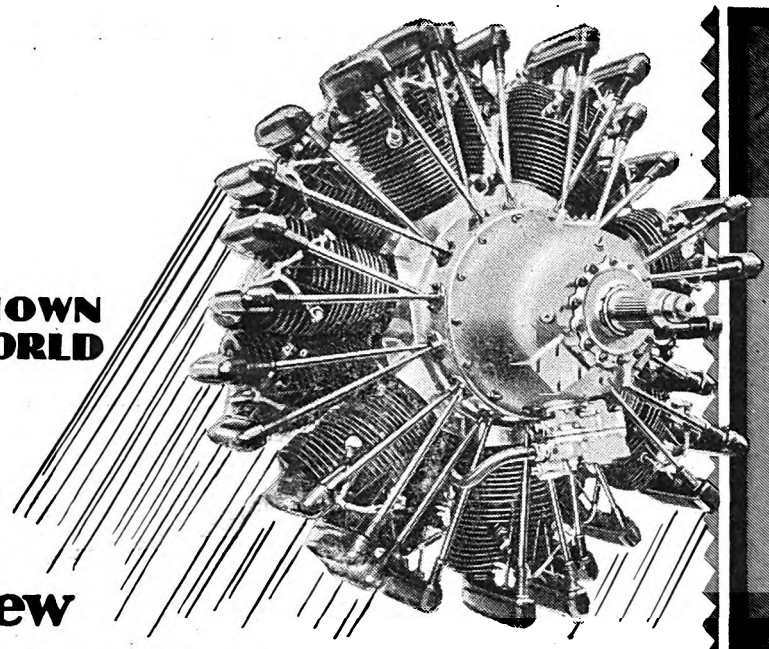

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## THE BRUSSELS MEETING.

On Sept. 21 there was held at the Evère Aerodrome, Brussels, an aviation meeting which was organised by the *Aéro Club Royal de Belgique* in connection with the Belgian Centenary Celebration.

The meeting opened with the departure of three light aeroplanes on a speed race over a 300-km. course to Antwerp, Liège and back to Brussels. This race was part of the *VIIIe Concours Internationale d'Avions Légers et de Tourisme* for the Trophy presented by H.M. the King of the Belgians. Out of a total entry of six only three machines competed, two of which were Klemm monoplanes, one with a 100 h.p. Argus flown by Herr Lusser and the other with a 40 h.p. Salmson and flown by Herr Fahrbach. The third was a Potez 36 (95 h.p. Renault) which did not complete the course. This race, which finished late in the afternoon, was won by Herr Lusser.

The second event was a *Demonstration de Maniabilité au Sol* by M. Barbot in a Fokker C-IX biplane. This machine, which is the latest two-seat reconnaissance biplane produced by the Fokker Company, is fitted with Messier wheel-brakes and M. Barbot demonstrated the ease with which a machine of this type may be made to describe small circles on the ground, solely with the aid of brakes and engine.

Event No. 3 was a formation flight by three Westland Wessex cabin monoplanes (Genet Major engines) belonging to the Sabena Company.

This was followed by a demonstration by five Bréguet XIX day-bomber biplanes of a squadron belonging to the *IIIe Groupe de Bombardement du 2me Régiment d'Aéronautique* commanded by Major Massaux. This squadron flew over in Vee formation, in line astern, and after breaking up they landed.

Event No. 5 was a triple parachute descent by M. Stachevsky. This ended fatally. The parachutist jumped at about 4,000 ft. and after opening and releasing two parachutes he apparently misjudged his height and hit the ground before his third parachute opened. There was a high wind blowing and it is thought that he deliberately lost a lot of height in an attempt to keep within reach of the aerodrome. He was also seen to turn over after releasing his second parachute and this may have caused him to lose his bearings Whatever happened, this should serve once again to impress on the organisers of aviation meetings that parachute exhibitions are an undesirable feature, and may do considerable harm to the cause for which the meeting was organised. And anyhow they pander to a barbaric taste.

Immediately after the tragedy Mr. Hubert Broad went up to give an exhibition of the *Haute Ecole Aérienne*. This was quite up to the usual high standard maintained by this excellent pilot.

He was followed by M. Michel Detroyat in a Morane monoplane, who also put up an excellent show.

Thereafter followed three demonstrations of aerobatics in formation by a flight of three Avia B.H.21 single-seat fighters of the *Ier Groupe de Chasse du 2me Régiment d'Aéronautique*, Belgian Army, commanded by Major Hansenne, by a flight of Armstrong Whitworth Siskins of No. 43 (Fighter) Squadron, R.A.F., commanded by Sq. Ldr. C. N. Lowe, M.C., D.F.C., and by a flight of three Fokker C-V-D two-seat biplanes of the Royal Netherlands Army Air Service commanded by Capt. W. J. C. Versteegh.

The three demonstrations were all good. The Belgian formation seemed to be unpractised, but any irregularities may have been due to cautiousness prompted by the high wind that was blowing.

The Fokker formation was very good, and bearing in mind that the machines were big two-seaters their demonstration was excellent. One novel manœuvre was for the leader to loop from his position at the head of the Vee back into position without disturbing the other two machines.

The Flight of three Siskins of No. 43 Squadron tied together was magnificent, and their show, which is familiar to visitors to the R.A.F. Display and the Leicester Meeting earlier this year, was one of the very few that roused the huge crowd to enthusiastic cheering. Their formation appeared to be even closer than it had ever been seen before and their loops came right down to the ground. A French military formation which was down on the programme to follow No. 43 Squadron did not materialise.

Thereafter followed a formation flight by five Fokker F.VII-3m commercial monoplanes with Titan engines, belonging to the Sabena Company, and lastly an evolution of three Bréguet XIXs and six D.H.4s of the *IIIe Groupe du 1er Régiment d'Aeronautique* of the Belgian Army.

The Meeting was supported by a huge crowd which has been estimaed at 100,000. The organisation was good but later in the afternoon the delays between the events gradually increased, an almost inevitable state of affairs which can only be corrected by long experience, first-class staff work, and strict discipline.

## THE AIR RACE TO AUSTRALIA.

Since the suggestion was made some weeks ago in this paper quite a handsome prize has been put up for an air race to Australia provided that not less than four starters are available. At the moment I am not at liberty to disclose the name of the donor of the prize.

After all we have heard about people wanting to rush off to Australia to break Sq. Ldr. Hinkler's record one would have thought that the starting line would have been overcrowded, but there seems to be some strange difficulty in raising the four starters.

As readers already know, Mr. Matthews went off last week, more intent on stealing a march on the rest and getting a record than on competing for the prize. And, as he was warned, he met the monsoon,—which put him out of action.

Of the others, Wing Cdr. Kingsford Smith was told some time ago by his doctor that he is not yet fit enough after his operation in Holland for such an undertaking, and though last week he was determined to go for the record, with or without a prize, he has now, I hear, gone down with influenza.

Mr. Charles Barnard, who was also very keen on the record, and was quite ready, as a good sportsman, to make a race of it with anybody, was taken ill last week, apparently as the result of sheer overwork, and so he may not be available, though personally I hope he will.

Mr. Chabot, who was keener than anybody on making a race of it, is reported as having been obliged to abandon the flight, at any rate for the time being, for business reasons.

Mr. Hill, an R.A.F. officer, is apparently still in the running.

Mr. Edgar Percival, with his Hendy 302, is a possible competitor.

Mr. Neville Stack also talks about having a go at it, which would certainly be a very good advertisement for Smith's Instruments if he broke the record, and/or won the prize.

And lastly Mr. Pickthorn and Mr. Murray, who really do not want to race at all but merely want to tour to Australia in comfort, might be induced to come in just to make a field.—C. G. G.

## MR. MATTHEWS' MISHAP.

Mr. Matthew's continued his attempt to fly to Australia from Karachi, which he reached on Sept. 22 as related in THE AEROPLANE of Sept. 24. He arrived at Allahabad next day and at Calcutta on Sept. 24. At this point he was two days in advance of Sq. Ldr. Hinkler's time, who took 11 days for the journey thus far, and on even terms with Miss Johnson's record.

The following day he got to Rangoon, and his ten days for that distance is a record, because Miss Johnson was held up for two days at Insein. That is Mr. Matthews' one solace for the present as he damaged his machine seriously next day.

He set out from Rangoon for Bangkok early next morning but was forced back by low clouds on the mountains. At 13.30 hours he tried again and nothing more was heard of him for some time. He later arrived at Bangkok by train and reported that his trip over the mountains had been made through severe storms, and darkness overtook him before he was able to reach Rangoon. He tried to land in the darkness at Ban Me, 100 miles north of Muang Don, broke his airscrew and damaged one wing and the tail unit.

Mr. Matthews is carrying a spare airscrew and the Siamese Minister of War has sent mechanics to help him with repairs. He intends to finish his flight to Australia and to try for a new record on the way back.

Naturally we are all sorry for Mr. Matthews, who is one of the most popular pilots in this country, but he was fully warned beforehand that he was starting too early and would certainly butt into the last part of the monsoon weather. If only he had waited and had made a race with all the others who yearn for the Australian record he might have had better luck.

## BUSINESS CALLING.

The Municipal Intendant (Lord Mayor) of Buenos Aires has called for tenders on an aerial survey of the city, according to *The Times* of Sept. 30. Among the firms which have been invited to tender is the Aircraft Operating Company Ltd., of London, which made an air survey of Rio Janeiro.

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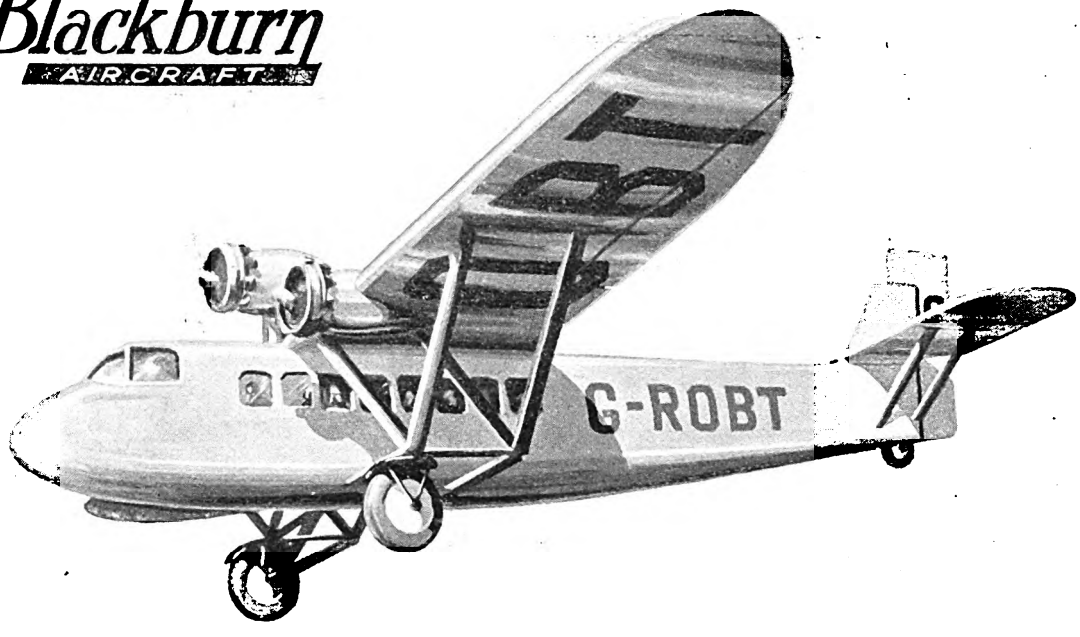


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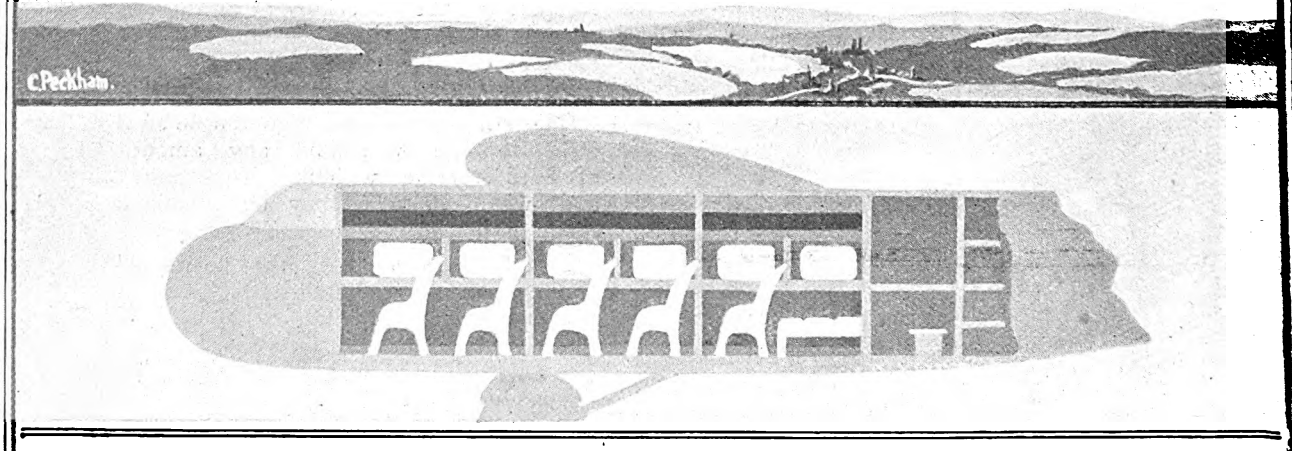


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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, September 23.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Lt. J. N. Jaques, R.A.R.O., is granted a S.S. comn. as Flg. Off. with effect from Sept. 9 and with seniority of Oct. 31.

The following are granted temp. comns. as Flg. Offs. on attachment for duty with the R.A.F. (Sept. 7):—LT., R.N.—A. M. McDowell. SUB-LTS., R.N.—H. P. Bramwell, D. R. F. Cambell, M. K. Cavenagh-Mainwaring, D. C. V. Pelly, H. C. N. Rolfe, D. M. Russell, G. N. Torry. LT., R.M.—J. L. Moulton.

The following Plt. Offs. on probation are confirmed in rank:—H. D. Primrose (Aug. 12); R. B. Abraham, M. J. Adam, J. C. Atkins, A. C. Bailey, J. L. C. Banks, D. Barclay, R. J. Cohen, N. Kirkham, A. N. Luxmoore, J. E. C. McClure, R. M. Noblston, A. W. B. Page, M. E. Pickford, E. Poole, W. B. J. Sharp, G. E. B. Stoney, G. R. Stroud, L. Watson, R. L. West (Aug. 15); H. E. Mayes (Aug. 27); H. G. Adams, S. H. Bell, D. P. A. Boitel-Gill, L. E. Chiswell, G. B. S. Coleman, C. R. Davies, J. L. M. Davys, S. W. H. Egan, J. S. Hamilton, C. J. Hansford, L. M. Hooper, N. C. Hyde, B. N. Matson, L. R. Mouatt, E. E. Noddings, I. N. Roome, K. N. Sayers, S. D. Slocum, H. J. Ward, C. A. Washer, H. J. Wilson (Sept. 13); J. A. Nicholson (Sept. 23).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—E. G. Sharp (June 28); J. H. Manning-Fox (July 8); L. V. G. Barrow (Aug. 7); A. F. C. Booth, W. M. Rankin, A. C. Watson (Aug. 22).

Air Vice-Marshal E. R. Ludlow-Hewitt, C.B., C.M.G., D.S.O., M.C., is placed on the half-pay list, Scale A. (Sept. 22); Group Capt. R. H. Verney, O.B.E., is placed on the half-pay list, Scale A. (Sept. 18 to Oct. 12 inclusive).

The following Flg. Offs. are transferred to the Reserve:—CLASS A.—G. J. Powell (Sept. 16); D. G. K. Walker (Sept. 21). CLASS B.—J. H. Leach (Sept. 21).

Flt. Lt. G. N. Carroll relinquishes his S.S. comn. on account of ill-health (Sept. 15).

Lt. A. R. Baines, R.N., Flg. Off., R.A.F., relinquishes his temp. comn. on return to Naval Duty (June 27). Capt. J. M. Fuller, R.M., Flg. Off., R.A.F., relinquishes his temp. comn. on return to duty with the Royal Marines (Oct. 12, 1929). (Substituted for the notification in the *Gazette* of Oct. 15, 1929.) Flg. Off. J. W. Thompson (Lt., R.A.) relinquishes his temp. comn. on return to Army duty (Sept. 18). Lt. S. G. Long, R.N., Flg. Off., R.A.F., relinquishes his temp. comn. on resigning his comn. in the Royal Navy (Sept. 17). Lt. D. W. Mackendrick, R.N., Flg. Off., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Sept. 4). The S.S. comn. of Plt. Off. on probation R. Wardrop is terminated on cessation of duty (Sept. 24).

Flg. Off. H. T. J. Jagger is cashiered by sentence of General Court Martial (Sept. 17).

MEDICAL BRANCH.—Wing Commander H. M. S. Turner, M.B.E., M.D., M.R.C.S., L.R.C.P., D.T.M. and H., is placed on the retired list (Sept. 22).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—D. B. Smith is granted a comn. in Class A.A. (ii.) as a Plt. Off. on probation (Sept. 1).

The following Plt. Offs. on probation are confirmed in rank:—P. W. Moncreiff (July 12); J. H. Goodden (Aug. 29). The following Plt. Offs. of the Special Reserve are promoted to the rank of Flg. Off.:—J. B. R. Brooke (April 6); Hon. F. A. I. Eveleigh de Moleyns (April 24). Flg. Off. C. S. Kent is transferred from Class A to Class C (Feb. 22).

## Appointments.

*Week ending September 29.*

GENERAL DUTIES BRANCH.—Group Captains C. E. H. Rathborne, D.S.O., to H.Q., Inland Area, for duty as Chief Staff Officer, 22/9. G. I. Carmichael, D.S.O., A.F.C., to Station H.Q., Upper Heyford, to command, 22/9. R. H. Verney, to Half-pay List, 18/9.

Wing Commanders J. W. Cordingley, O.B.E., to R.A.F. Depot, Uxbridge, non-effective, sick, 2/9. F. L. Robinson, D.S.O., M.C., D.F.C., to Station H.Q., Kenley, to command, 22/9. P. A. O. Leask, to Home Aircraft Depot, Henlow, for engineer duties, 16/8. W. R. Read, M.C., D.F.C., A.F.C., to H.Q., Wessex Bombing Area, Andover, for duty in connection with the formation of Boscombe Down Station, 18/8.

Squadron Leaders H. S. Powell, M.C., to R.A.F. Depot, Uxbridge, 22/9. S. E. Toomer, D.F.C., to No. 2 Sqdn., Manston, 23/9. M. F. Browne, to No. 1 School of T.T. (Apprentices), Halton, 23/9.

Flight Lieutenants C. K. Chandler, M.B.E., to Air Ministry (A.M.S.R.), 13/9. D. M. Fleming, to Experimental Section, Royal Aircraft Estab., S. Farnborough, 15/9. R. H. W. Empson, to Station H.Q., Hornchurch, 22/9. B. A. S. Lewin, to R.A.F. Depot, Uxbridge, 3/9. C. C. Edwards, to Station H.Q., Kenley, 1/9. R. P. P. Pope, D.F.C., to C.F.S., Wittering, 23/9.

Flying Officers B. F. O. Smith, to E. and W. School, Cranwell, 22/9. N. W. A. Cullum, to C.F.S., Wittering, 1/9. J. O. H. Dobley, to No. 39 Sqdn., India, 23/9. A. D. Gillmore, to R.A.F. Base, Calshot, 22/9. F. G. Fairhead, to Experimental Section, Royal Aircraft Estab., S. Farnborough, 15/9. J. D. Richardson, to Station Flight, Andover, 13/9. J. B. Mackenzie, to R.A.F. Base, Gosport, 16/9.

Pilot Officers: The undermentioned are all posted to R.A.F. Depot, Uxbridge, on appointment to S.S. comns. with effect from 12/9:—J. R. S. Agar, H. L. Andrews, E. D. A. Bigg, G. R. Brice, T. H. Burleigh, F. Crump, P. F. Foss, A. H. Garland, M. V. Gibbon, T. P. Gleave, H. L. M. Glover, P. H. W. Hawkins, P. H. Heygate, P. W. Johnson, R. O. F. King, J. N. McAuley, R. A. McDonald, G. E. B. Nixon, P. J. Polglase, G. F. A. Skelton, C. G. Skinner, H. E. Slowey, A. Taylor, J. A. Tester, R. Williams. E. E. Ellison, to No. 20 Sqdn., India, 23/9. R. L. Phillips, to No. 28 Sqdn., India, 23/9.

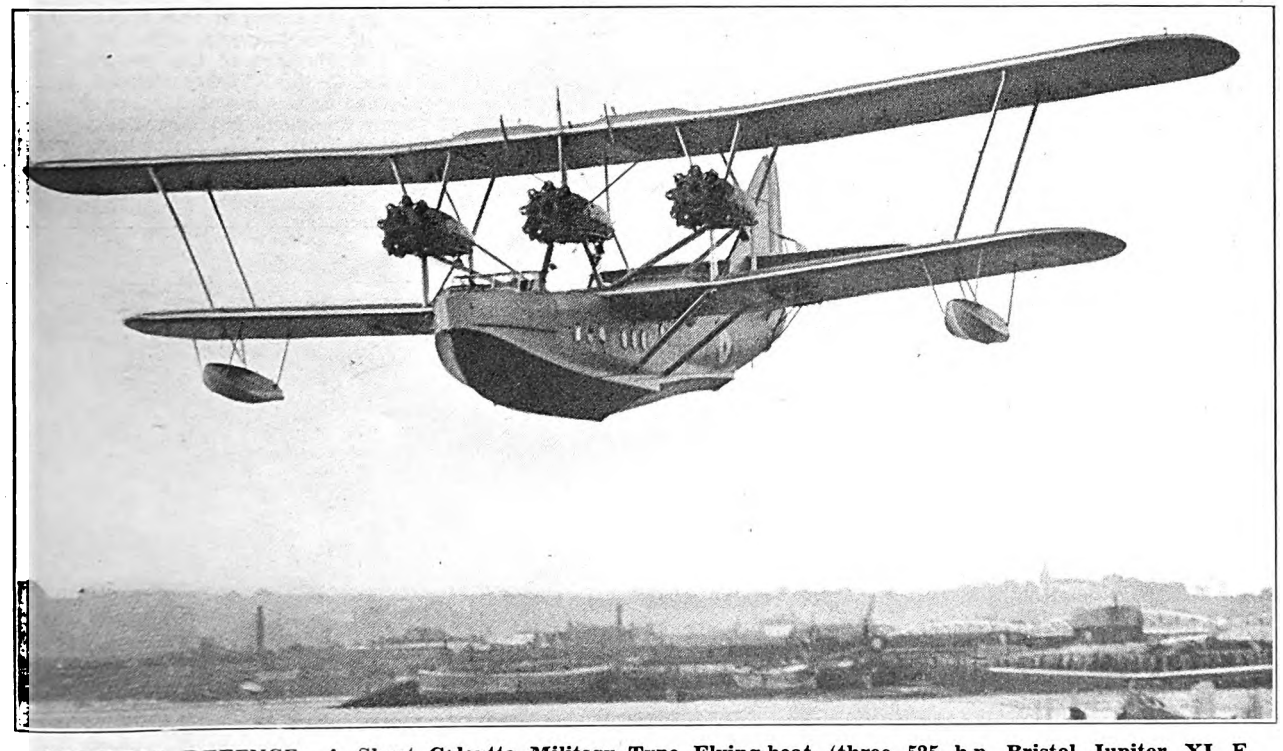
MEDICAL BRANCH.—Flight Lieutenants F. P. Schofield, to R.A.F. Depot, Uxbridge, 1/10. J. D'I. Rear, to R.A.F. Pathological Laboratory, Halton, 3/10. J. B. Murphy, to Station H.Q., Donibristle, 29/8.

STORES BRANCH.—Wing Commander W. F. Bryant, to No. 4 Stores Depot, Ruislip, 22/9.

## A Fatal Accident.

The Air Ministry regrets to announce that as the result of an accident near Rotherham to a Bristol Fighter machine of No. 2 F.T.S., Digby, Lincs., on Sept. 23, 1930, Plt. Off. Alfred Cecil Sant, the pilot and sole occupant of the aircraft, sustained injuries from which he died in hospital on Sept. 25.

An inquest was held at Rotherham on Sept. 27. Joseph Twigg, a farmer, said that the pilot made a forced landing in a field adjoining his farm and told the witness that his magneto was missing. The



**IMPERIAL DEFENCE.—A Short Calcutta Military Type Flying-boat (three 525 h.p. Bristol Jupiter XI F. engines). A Flight of these machines is going to the Persian Gulf in October.** —(*"Aeroplane" photograph.*)

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pilot examined the engine and decided to take off again. The witness said that the machine took off and rose to about 50 feet, but that the engine sounded very faulty. It was about 50 feet into the air when the engine stopped and the machine dived into the ground. Group Capt. Sidney Smith thanked the witness and others for their help and kindness to the pilot.

Sjt. Marks, a flying instructor at No. 2 F.T.S., said that Mr. Sant was his pupil and above the average. The machine was in proper order. Flt. Lt. J. S. White said that his theory was that the petrol pressure had fallen when the machine was on the ground and that the pilot had not noticed this and had omitted to restore the pressure by the hand-pump before taking off. A verdict of accidental death was returned.

### The Belgian Visit.

The visit by a Flight of Belgian Military aeroplanes to R.A.F. Stations, which was postponed from Sept. 22 to Sept. 23, and then again to Sept. 29, has again been postponed.

The visit will now not take place until next year.

### The Armament Officers' Bombing Trophy.

A Trophy, which will be known as the Armament Officers' Bombing Trophy, has been presented by long-course Armament Officers for competition among day bombing squadrons in home commands.

The Trophy will be awarded in 1930 to the squadron entering the crew which obtains the highest degree of accuracy in a competition, the conditions of which are similar to those for the Laurence Minot Trophy. In 1931 and subsequent years the Trophy will be awarded to the squadron obtaining collectively the highest degree of accuracy in annual bombing classification exercises under conditions to be laid down by the A.O.C.-in-C., Air Defence of Great Britain.

The Trophy will be held for one year by the winning squadron.

### The Laurence Minot Memorial Trophy.

The conditions of award of the Laurence Minot Memorial Trophy have been amended in consequence of the presentation of a trophy for competition among day-bombing squadrons. The Laurence Minot Trophy will in future be competed for solely by night-bombing squadrons in home commands.

In 1930 the Trophy will be awarded under similar conditions as heretofore to the crew of the night-bombing aircraft which obtains the highest degree of accuracy. In 1931 and in subsequent years, the Trophy will be awarded to the squadron showing the best collective bombing accuracy in the annual classification exercises, under conditions to be laid down by the A.O.C.-in-C., Air Defence of Great Britain.

### The R.A.F. Staff College.

The dates of the terms of the ninth course at the R.A.F Staff College are as follows:—

1st term, Jan. 19, 1931, to April 3, 1931; 2nd term, May 4, 1931, to July 31, 1931; 3rd term, Sept. 21, 1931, to Dec. 18, 1931.

The first date in each term is the first whole working day; for the first day of the course officers must, therefore, report on the evening of Jan. 18.

The following officers have been nominated by the respective Dominion Air Boards to attend the ninth course, beginning January 19, 1931:—

*Royal Australian Air Force*: Sqdn. Ldr. Francis W. F. Lukis.

*Royal Canadian Air Force*: Flt. Lt. George A. Mercer.

### Extension of Service of Specialist Officers.

The Air Council proposes in suitable cases to allow officers holding permanent commissions to extend their service on the active list from the normal retirement date up to a retiring age not exceeding 50 years of age. The only officers who will be considered for such extensions will be such as are classified E*, E, S*, or S in the Air Force List, or such as are filling a post to which an engineer officer is allowed by establishment. Officers whose service is so extended will normally be employed continuously on engineering or signals duty, as the case may be, during the period of their extended service.

Officers of the rank of flight lieutenant whose services are extended under the provisions of this order will, from the date of such extension, be eligible for promotion to squadron leader without passing examination "C."

This extension of service is a temporary expedient and approval for extension will only be given in such numbers to allow the requirements of the service to be met.

### Modern Foreign Languages.

The following officers and airmen passed the examinations held in June, 1930, in modern foreign languages, at the centres stated against their names:—

ARABIC.

(*Colloquial.*)

Sq. Ldr. A. B. Wiggin ('Iraq); 1337 F-S. H. Dewhirst (Middle East); 343269 Sjt. L. Welch (Middle East); 355960 Cpl. J. E. Ann (Middle East); L-AC. W. Geddes (Middle East); 350661 Sjt. W. H. Hills, D.C.M. (Aden).

(*Preliminary.*)

Flt. Lt. E. J. Howes ('Iraq).

FRENCH.

(*Preliminary.*)

Flg. Off. J. W. Homer (London); 343048 L-AC. A. L. Felix (London); 352095 L-AC. R. W. Haynes (London); 509483 AC.2. W. J. Dickens (London); 364102 AC.1. L. C. Menet (Middle East); 142584 Cpl. H. Dribell (Malta); Flg. Off. A. G. C. Somerhough (Far East); Flg. Off. J. R. Mutch (India).

*Interpreter* (*2nd Class*).—352967 L-AC. G. B. Oswald (Middle East); Flt. Lt. R. G. Hart, M.C. (India).

*Interpreter* (*1st Class*).—Sq. Ldr. W. Elliott, D.F.C. (Middle East); 509997 AC.2. C. M. Inglis (Middle East); Sq. Ldr. C. Porri ('Iraq).

*Interpreter* (*Requalification*).—Flt. Lt. R. J. Montgomery-Moore (London).

ITALIAN.

(*Preliminary.*)

358169 L-AC. L. Pownall (Malta).

NORWEGIAN.

(*Preliminary.*)

Flg. Off. G. F. Whistondale (London).

### Central Flying School Categories.

The following officers and airmen pilots have been recategorised as under from the dates shown against their names:—

*A2 to A1*.—Flt. Lt. T. G. Pike, 11.8.30; Flg. Off. W. E. P. Johnson, 11.8.30; Flt. Lt. C. H. Brill, 18.8.30; Flg. Off. L. H. Mason, 22.8.30; Flg. Off. J. F. Lawn, 22.8.30.

*B to A2*.—Flt. Lt. H. I. T. Beardsworth, 13.8.30; Flg. Off. J. E. Markby, 22.8.30; 86025 Sjt. Newman, F. W., 22.8.30.

*C to B*.—Flg. Off. M. C. Collins, 22.8.30; 362145 Sjt. Shippobotham, H. P., 11.8.30; 362622 Sjt. Ratcliffe, G. A., 22.8.30.

The undermentioned officer is awarded a *B* category under para. 353, clause 10 (*g*), of K.R. and A.C.I.:—

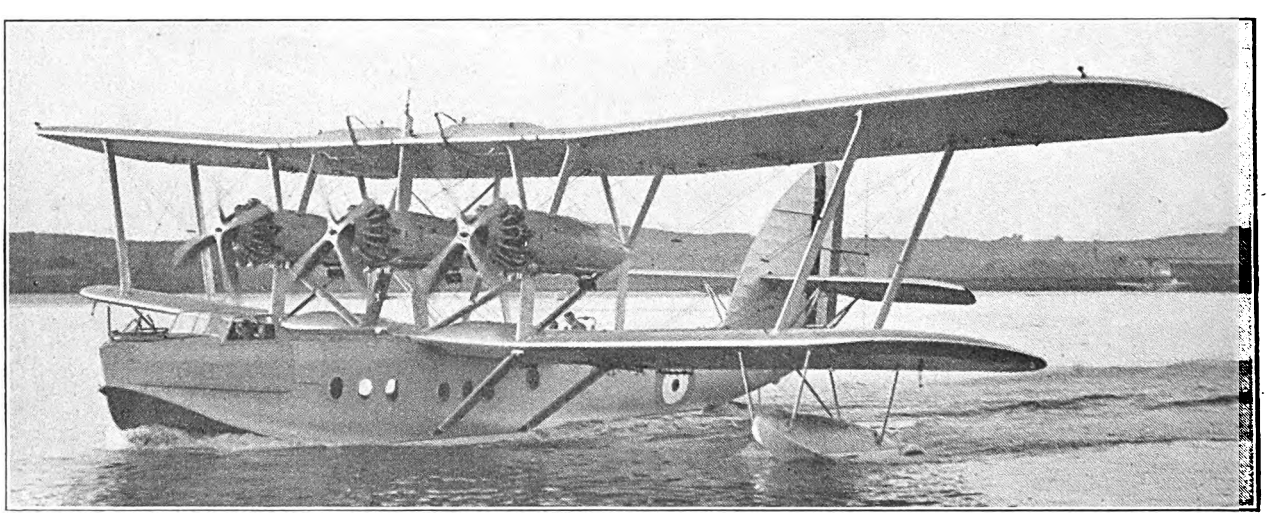
Flt. Lt. W. M. Fry, M.C.

### Foreign Officers Attached to the R.A.F.

Captain A. Dzenitis of the Latvian Military Air Force and Warrant Officer van Damme of the Belgian Military Air Service will join the Central Flying School, Wittering, on Sept. 30 on attachment to the Royal Air Force.

### No. 13 (Army Co-operation) Squadron.

No. 13 (Army Co-operation) Squadron which was temporarily located at Odiham, returned to Netheravon on Sept. 1.



**FOR THE PERSIAN GULF.—The Short Calcutta (three Bristol Jupiters) four of which are to be the new equipment of No. 203 (Flying-boat) Squadron at Basrah.**—(*"Aeroplane" photograph.*)

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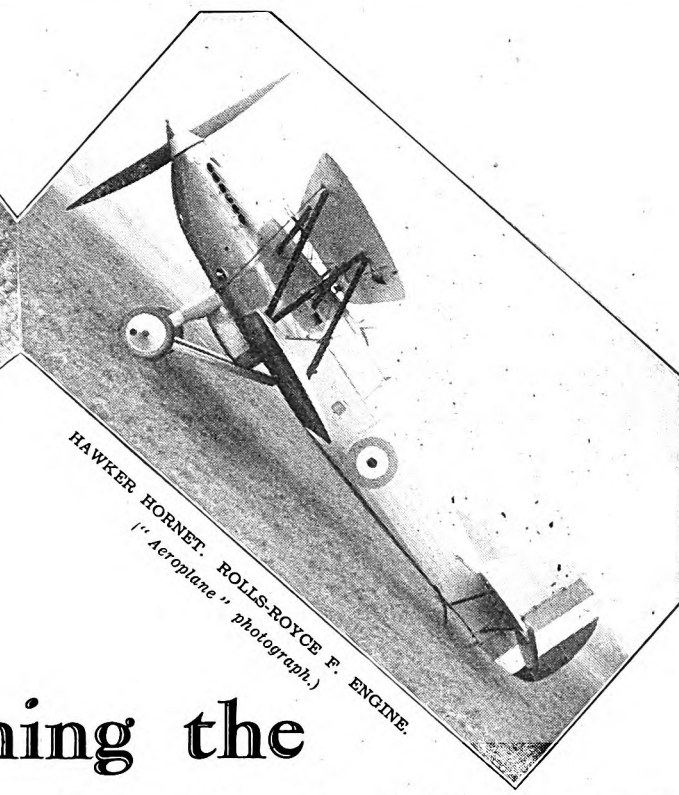
HAWKER HART. ROLLS-ROYCE F. ENGINE.
(" Aeroplane" photograph.)



HAWKER HORNET. ROLLS-ROYCE F. ENGINE.
(" Aeroplane" photograph.)

# Concerning the Air Exercises of the R. A. F., 1930

" I saw a succession of striking raids which showed dramatically the advantage of high speed in bombing. Although the 'HARTS' were less than 2,000 feet up the defending fighters, actually far inferior in speed, had no chance. It was 180 miles per hour versus 150 miles per hour."—*The Daily Telegraph*, Aug. 13th.

" To the ordinary observer there seemed to have never been any hope that the defence could come up to these fast machines." —*The Times*, Aug. 13th.

" A completely successful raid by flights of 'HARTS,' the fastest of all the bombers, which left the defending fighters standing." —*The Times*, Aug. 14th.

" The Day Bomber already referred to is the 'HART.' The only already adopted fighter which could deal with it is the 'HORNET.' " —*The Daily Telegraph*, Aug. 16th.

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### The Health of the Royal Air Force in 1929.

In submitting his Report on the Health of the Royal Air Force in 1929, Air Commodore J. McIntyre, M.C., M.B., Director of Medical Services, R.A.F., states that the incidences of sickness, of deaths and of invalidings, both from abroad and finally from the Service, although slightly higher than in 1928, are well below the average of the two earlier periods, 1921-4 and 1925-8.

The Report itself states that the incidence of sickness at home and abroad for all cases was 737.2 per 1,000 strength compared with 701.4 in 1928. There was a slight reduction in the average number of days' sickness per head and an appreciable reduction in the average duration per case. The outstanding figure in the table which analyses the total sickness of the Force is the proportion of sickness attributable to influenza. During the year under review 9.5 per cent. of sickness was due to this disease compared with 3.1 per cent. in 1928 and previous averages of 5.6 and 5.7. Other tables show that the tendency to influenza and kindred diseases decreases with increasing age, and that a large percentage of the cases of influenza occurred at Flower Down, a station which, during the spring of 1929 had a large number of Aircraft Apprentices who have since been moved to Cranwell.

The incidence of sickness in the Fleet Air Arm is the lowest recorded during the last three years, prior to which no separate records were kept for this branch.

Invaliding from commands abroad to the United Kingdom rose from 17.0 per 1,000 strength in 1928 to 18.4 in 1929 but compares favourably with the rates for the two previous periods. Two hundred and thirty-eight cases were finally invalided out of the Service.

There were 72 deaths from injury compared with 97 in 1928, and 33 deaths from disease compared with 40 in 1928. The tendency is for disease and injury to decrease in the higher age groups. Officers and Cadets show a higher injury rate than any group of airmen.

In Flying Units the death incidence is highest and the sickness incidence lowest. Diseases of the digestive system are higher in the two groups, officers, cadets and airmen pilots, and aircraft-apprentices, than in any other.

Medical non-effectiveness by Commands as shown by the number of days sickness per head is highest in 'Iraq with 16.3 days and lowest in the Mediterranean Littoral with 7.2 days.

Tuberculosis is the principal cause of invaliding, and of the cases of which there was no previous family history of tuberculosis, the possibility of occupation as a factor has been considered. Two of the cases were in motor-boat crews for two or three years, two worked in blacksmith's shops and one had been employed on photographic work for more than ten years.

The total number of cases of injury in 1929 was 2,359 an incidence of 75.7 per 1,000 strength. Fifty-seven per cent. of all accidents occurred on duty. Six per cent. of all injuries on and off duty were the result of flying accidents compared with 6.6 in 1928. There were fewer deaths from flying accidents in 1929 than in any one year since 1921* and more aircraft hours were flown per accident resulting in death or injury than in any other previous year.

Twenty-seven cases of injury, representing a total of 1,841 days' sickness, were due to injuries caused by airscrews. Thirty-six cases of injury, representing 920 days' sickness, occurred while starting aircraft engines and are not included in the airscrew figures. Injuries as the result of motor accidents totalled 431 and resulted in 19 deaths and seven invalids. There were 993 cases of injury sustained in athletics,—football accounting for 66 per cent.

A wireless operator was killed by rifle fire in 'Iraq and one of the crew of an armoured car was wounded by rifle fire in Palestine. There were no injuries during practice parachute descents. Included in the nine deaths among cases off duty were two suicides.

Eastchurch had the lowest case incidence of sickness during the year and Flower Down the highest in the home commands.

All commands abroad showed a satisfactory decrease in the number of cases of sickness but an increase in the incidence of primary malaria. This disease was at its peak in 'Iraq in July and in India and the Mediterranean in October.

Of the 845 candidates examined for commissions in the General Duties Branch only 494 were finally accepted. Defective vision, as in previous years, was the most frequent cause of rejection.

Investigation into the effects of fast flying and intensive aerobatics was completed during the year, including a special medical overhaul of the pilots of the High Speed Flight. The results showed that no special methods beyond the ordinary routine examination were required in the selection of R.A.F. personnel for high-speed flying, and that the rotation test employed at the Central Medical Establishment to ascertain suitability for aerobatics was as proficient in its indications as was the specially-built whirling arm built for this purpose.

Medical examination during the period of training for high-speed flying was found to be unnecessary but the training should be under medical supervision. The Report continues:—

> The chief effect of steep banking at high speed, "blacking-out," appears to be due to withdrawal of blood from the eye itself, a condition which, however, does not incapacitate the individual to a degree which renders management of the aircraft impossible. The dimming or "blacking-out," however, should be regarded by pilots as a warning not to increase these effects by turning further. Investigation is still required as to the best position for the pilot in the aircraft to combat such effects, aided by a good supply of fresh air upon the face, or by the administration of oxygen.

At established home stations the remaining war-time structures are being steadily replaced by permanent buildings providing quarters of a high standard of comfort and hygiene.

A summer rest camp has been established at Mirgamir in Kurdistan, 7,000 feet above sea level. The Aircraft Depot at Karachi has been mosquito-proofed.

A new source of water supply for Aden has been found in the bore wells at Sheikh Othman.

In 'Iraq 55 patents were evacuated over a total distance of 6,518 miles in 23 trips by air. Thirteen of these were routine communication trips and ten were specially requisitioned. In Palestine ten patients were flown 600 miles in nine trips, for seven of which aircraft were employed specially for the evacuation and in two of which the medical authorities availed themselves of routine communication flights. One emergency case at home was flown 53 miles from the station to hospital.—C. M. MCA.

[*There was probably less flying in 1921 than in any year since the Armistice. This is not official, but conditions make it probable.—C. G. G.]

### Transfers to Reserve.

The following officers, serving on short-service commissions, become due, on the dates stated, to transfer to the Reserve on the completion of their service on the active list of the R.A.F.:—

October-December, 1930.

*Flight Lieutenants*:—V. Vincent Brown, L.R.C.P. and S., M. Clancy, L.R.C.P. and S., C. P. O'Toole, L.R.C.P. and S.—Nov. 15.

*Flying Officers*:—C. A. Anderson, T. B. Byrne, L. G. Gray, F. J. Parker, J. G. Parkin, L. C. Phillips, R. J. Stone, R. O. O. Taylor—Nov. 28.

### A No. 28 Squadron Re-Union.

A Re-union Supper will be held by No. 28 Squadron Old Boys' Association on Oct. 18 at the White Horse, 100, High Holborn (near Holborn Tube Station). The company will assemble at 6 o'clock. Tickets 3s. 6d. each may be had from C. T. Hodges, 102, Camden Street, N.W.1.

A party of members of the Association, some of them accompanied by their wives, recently paid a visit to the R.A.F. Station at Gosport where No. 28 Squadron was stationed during the War 1914-18. The party was most hospitably received and entertained by the R.A.F. at Fort Grange and spent a thoroughly enjoyable afternoon.

### The R.A.F. Rugby Cup Competition.

Units wishing to compete in the Inter-Unit Rugby Cup competition should forward their entries before Oct. 11, 1930, to the Secretary, Inter-Unit Rugby Cup Competition, R.A.F. Rugby Union, Room 644, Air Ministry, W.C.2.

Units which are unable to enter are requested to forward a notification to that effect.

### In the Tail Gun-Pit.

A certain amount of misapprehension seems to exist concerning the short article under the foregoing heading which appeared in The Aeroplane last week.

The article in question was largely imaginative and has little relation to fact.

### The "R.A.F. Quarterly" Prize Essays.

The subjects and conditions for the *R.A.F. Quarterly* prize essay for 1930 are as follows:—

*No.* 1.—Discuss the means by which the mobility of air units for inter-reinforcements between commands can be improved.

The essay should cover all aspects of the problem, *e.g.*, the movement of air units from England and the Dominions to commands overseas—the organisation of air units to move and to be ready to operate at their destination in the shortest possible time—and so on.

The improvements suggested should be practicable within the bounds of existing technical knowledge, and the necessity for the utmost economy in defence expenditure must be taken into account.

*No.* 2.—Forecast the possible technical development of airships and the civil and military uses to which they may be put. If it is thought that they are likely to become a regular and widely used means of transport, discuss their effect on Empire and world politics.

*Conditions.*—Competitors must be serving in the regular, auxiliary or reserve forces of the R.A.F. or of the dominion air forces.

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## WORLD'S PREMIER LIGHT AEROPLANE

Underlying the success of the Gipsy Moth is experience . . . twenty-two years' experience in designing aircraft by its Designer . . . ten years' experience in manufacturing aircraft by its manufacturers . . . and nearly six years' experience in producing this one type alone at the Moth factory.

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# GIPSY MOTH




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The prizes for each essay are allotted as follows:—

Twenty-five guineas to the writer of the essay placed first.

Fifteen guineas to the writer of the essay next in order of merit.

Fifteen guineas to the writer of the best essay submitted by a member of the dominion air force. This prize will not be awarded in the event of a member of the dominion air forces being awarded the first or second prize.

The closing date for both competitions is Mar. 1, 1931.

The essays must not exceed 20 pages of the size and style of *The R.A.F. Quarterly*, 10,000 words in all.

When a reference is made to any work, the title of such work must be quoted.

The essays must be strictly anonymous, and each must have a motto and be accompanied by a sealed envelope with the motto written on the outside and the name of the competitor inside. They should be addressed to:—

The Editor, "The Royal Air Force Quarterly," Gale and Polden, Ltd., Wellington Works, Aldershot.

The essays will be submitted for decision to the three service representatives on the Advisory Committee of *The R.A.F. Quarterly*. The editor and publishers of *The R.A.F. Quarterly*, after due consultation with this committee, retain the right to make no award in favour of any essay which does not, in their opinion, attain a sufficient standard of excellence.

The awards will be made known in the July issue of *The R.A.F. Quarterly*.

All essays must be typewritten and submitted in quadruplicate. The only exception to this rule is for maps, only one copy of which is necessary, and this should be affixed to the original essay.

All essays submitted will become the property of the publishers absolutely, but will not be published without the sanction of the Air Council having first been obtained.

## AN AIR MINISTRY APPOINTMENT.

The Secretary of State for Air has appointed Mr. L. G. S. Reynolds, O.B.E., to be his Principal Private Secretary in place of Mr. C. Ll. Bullock, C.B., C.B.E., who will shortly succeed Sir Walter Nicholson as Secretary of the Air Ministry.

## THE NEW ZEALAND TERRITORIAL AIR FORCE

The strength of the New Zealand Territorial Air Force is shortly to be increased by the formation of four squadrons. At present the Force consists of about sixty officers, and twenty more are to be added from pilots who pass the examination for entrance to the Force this month.

The Director of Air Services states that the four Squadrons will be drawn from the following provinces:—

No. 1 Squadron—Auckland and Hawke's Bay.

No. 2 Squadron—Wellington and Taranaki.

No. 3 Squadron—Nelson, Marlborough, Canterbury and Westland.

No. 4 Squadron—Otago and Southland.

The new scheme will make the Force similar to the Auxiliary Air Force in Great Britain. Training will continue throughout the year.

An examination has been prepared for Club-trained pilots between the ages of 18 and 30 who, if accepted and passed medically and otherwise, will be given a course and commissions as pilot officers. If, after two years, these pilot officers fail to pass the promotion examination to flying officer, their commissions will be terminated.

While on duty the pay will be 8s. a day, with 10s. flying duty pay.

## AN AIR FORCE FOR EGYPT.

A Reuter message from Cairo dated Sept. 25, states:—

The Egyptian War Minister, in collaboration with Spinks Pasha, Inspector-General of the Egyptian Army, has concluded arrangements for the formation of an Egyptian Air Force under British supervision. At the outset it will consist of five machines.

There are at present three Egyptians under tuition in England, and five attached to the R.A.F. at Abu Suwir.

## A "SKY PILOT" FOR CENTRAL AFRICA.

Dr. G. A. Chambers, Bishop of Central Tanganyika, has been trying to find a young clergyman who will be a real "sky pilot" for the scattered Europeans in the former German territory of Tanganyika, which is now his diocese. Last month he began his search, and says that he has already been successful, and that the future flying missionary is already taking flying lessons, and is hoping to fly out to Central Africa from London next year. As the recruit wishes to remain in his present curacy till next June he prefers that his name should not yet be published.

The Bishop is reported by a correspondent as saying:—"Having found the right man, I do not fear that I shall have great difficulty in raising the £595 necessary for his two-seater Gipsy-Moth. Owing to the lack of railways the only quick method of travel is by air across the thousand miles of my diocese from Morogoro, 200 miles from Dar-es-Salaam, to the Western shore of Lake Victoria, and then South-west to Kigoma, near Ujiji, on Lake Tanganyika. With a 'plane, this flying missionary would be able to visit Europeans to minister to them and also to hold services for Africans in the same places, both of whom would otherwise be in almost complete isolation for long periods. Before he can effectively cover the whole of this vast area, however, we shall also have to have half a dozen shelters for his aeroplane at his various 'dropping' places."—H. W. P.

## A TREAT FOR READERS OF GERMAN.

[*Mit Graf Zeppelin nach Süd-u Nordamerika.* By Kapitänleutnant Joachim Breithaupt. 54 Illustrations. 1 Map. 119 pp. and appendices. Verlag von Moritz Schauenburg A.G., Lahr (Baden), Germany, and from The Aeroplane Book Dept.]

This book which, as its title indicates, is an account of the flight in the spring of the present year, of the *Graf Zeppelin* from Friedrichshafen to Rio de Janeiro, returning by way of Lakehurst, N.J., should appeal strongly to those who, possessing a working knowledge of German, are interested in any degree whatever in air travel and airship development generally. In fact, it would be difficult to suggest a more interesting text-book for the use of fairly advanced students of the German language, whether primarily air-minded or not.

In his preface the author describes the book as a "faithful account of the first airship flight across the Equator." The fact that he is a Lieutenant-Commander in the former Imperial German Navy who himself commanded Zeppelin airships during the War 1914-1918, should be sufficient guarantee of the accuracy of the work, and Kapitänleutnant Breithaupt follows up an invitation to his readers to experience again with him the joys of airship travel by escorting them on one of the most interesting arm-chair journeys they are likely to enjoy for some time to come.

The book is entirely non-technical, but the constructional features and handling of the airship are described in considerable detail and, while the higher-mathematical mysteries of aerial navigation are ignored, the finer points of airmanship and the influence thereon of local meteorological conditions are carefully and thoroughly explained.

Apart from scenic descriptions which are well supplemented by a series of excellent, if not too well reproduced, photographs, the author devotes considerable space to such matters as the relative merits of different types of mooring mast and the probable lines of future development of terminal airship harbours.

The actual narrative is followed by a general survey of the air routes over which airships, by virtue of their great radius of action, should logically be employed in the near future, and touches, albeit lightly, on the sphere of usefulness of catapulted seaplanes working in conjunction with high-speed ocean liners of the *Bremen* type.

The appendices include crew and passenger lists, and a summarised record of the various flights undertaken by the *Graf Zeppelin* since her construction.—H. E.

## THE SEA WAY FROM AUSTRALIA.

Those who are as tired of American films as they are of "Lone Australian Fliers" should demand of the manager of their nearest cinema that he shall hire and exhibit "The Windjammer," one of the best British films that has ever been produced. "The Windjammer" is the sound-film record of a journey from Wallaroo in Australia to London, round the Horn in the last of the full-rigged Cape Horn windjammers. The part of the film actually taken at sea is the work of A. J. Villiers and Ronald Walker, two Australian journalists who shipped before the mast in the *Grace Hawar*.

A story, in which most of the parts are taken by the actual crew of the ship, is introduced and some of the fo'c'sle scenes have been taken in a built-up set in England. Otherwise the film is a straightforward record of the voyage, with dramatic incidents and magnificent photography. Ronald Walker, one of the photographers, was killed during the voyage and his burial at sea is introduced into the story of the film in a restrained and sympathetic manner which cannot offend anybody. The scene at the end between the dock policeman and one of the seamen should be cut out entirely because it is an anti-climax. Otherwise the film is nearly perfect.

I understand that a number of old shipmasters were invited to the private view of the film and even they could find little to criticise. The rising generation who think, because they can rush round the sky in a tin bird, that they have inherited the earth, should go and see this film and learn how their ancestors travelled to Australia.—C. M. McA.

## "AEROPLANE" POSTCARDS.

Sets of six "Aeroplane" photographs printed on postcards may now be had from The Aeroplane Photograph Department, 175, Piccadilly, W.1, at 2s. a set post free.

Each set contains a flying photograph of the Bristol Bulldog, the Hawker Hart, the Hawker Horsley, the Boulton and Paul Sidestrand, the Fairey III F, and the Westland Wapiti.

This set is known as "Set A," and further sets will be available from time to time.

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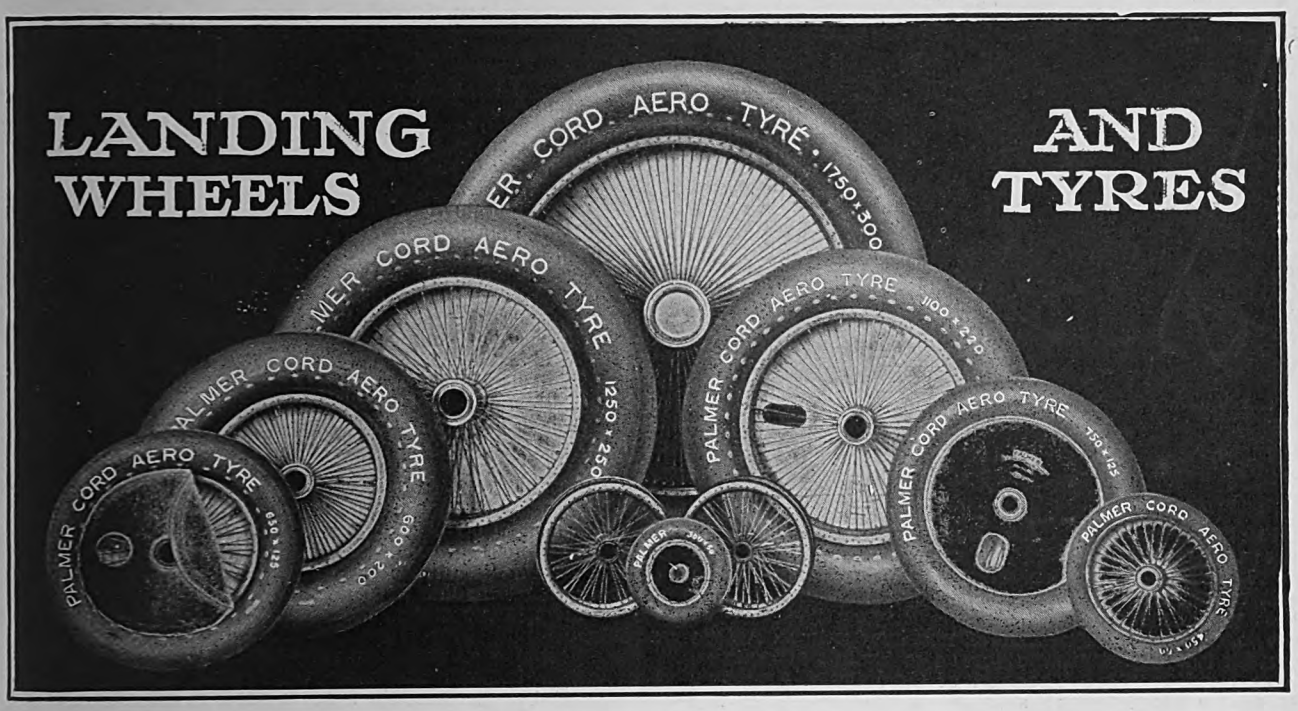
# PALMER




## STANDARD SIZES.

| Tyre Size | Wheel No. | Hub Length | Hub Bore | Track Line | Tyre Size | Wheel No. | Hub Length | Hub Bore | Track Line | Tyre Size | Wheel No. | Hub Length | Hub Bore | Track Line |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m/m | m/m | m/m | | | m/m | m/m | m/m | | | m/m | m/m | m/m |
| 375×55 | 168 | 111.12 | 25.4 | Central | 700×100 | 112 | 150. | 38.09 | Central | 1000×150 | 210 | 185. | 60.32 | Central |
| ,, | 195 | 130. | 38.09 | Central | ,, | 176 | 178 | 44.45 | Central | 1000×180 | 148 | 220. | 80. | Central |
| 300×60 | 16 | 111 12 | 25.4 | Central | ,, | 179 | 178. | 55. | 132/46 | ,, | 149 | 185. | 55. | Central |
| 450×60 | 30 | 89. | 31.75 | Central | 650×125 | 119 | 178. | 55. | 132/46 | ,, | 155 | 220. | 66.67 | Central |
| ,, | 172 | 130. | 38.09 | Central | ,, | 147 | 178. | 55. | Central | ,, | 166 | 185. | 55. | 125/60 |
| 575×60 | 21 | 160. | 28. | Central | ,, | 188 | 120. | 34 92 | Central | 900×200 | 107 | 185. | 55. | Central |
| ,, | 180 | 150 | 38.09 | 104/46 | ,, | 336 | 178. | 44.45 | 132/46 | ,, | 108 | 185. | 55. | 125/60 |
| ,, | 186 | 120. | 34.92 | Central | 750×125 | 77 | 178. | 44.45 | 132/46 | ,, | 128 | 220. | 66.67 | Central |
| ,, | 190 | 150 | 38.09 | Central | ,, | 92 | 185. | 55. | 135/50 | ,, | 137 | 250. | 80. | Central |
| 600×75 | 24 | 160. | 28. | Central | ,, | 95 | 185. | 55. | Central | ,, | 157 | 185. | 80. | Central |
| ,, | 180 | 150. | 38 09 | 104/46 | ,, | 99 | 178. | 38.89 | 132/46 | ,, | 202 | 185. | 60 32 | Central |
| ,, | 186 | 120. | 34.92 | Central | ,, | 112 | 150. | 38.09 | Central | 1100×220 | 134 | 220. | 66.67 | Central |
| ,, | 190 | 150. | 38.09 | Central | ,, | 176 | 178. | 44.45 | Central | ,, | 136 | 250. | 80 | Central |
| 700×75 | 78 | 178. | 44.45 | 132/46 | ,, | 179 | 178. | 55. | 132/46 | 975×225 | 192 | 185. | 60 32 | Central |
| ,, | 79 | 178. | 44.45 | Central | 800×150 | 161* | 185. | 55. | 135/50 | ,, | 194 | 185. | 55. | 125/60 |
| ,, | 100 | 178. | 38.09 | 132/46 | ,, | 162* | 185. | 55. | Central | 1100×250 | 364 | 220. | 60.32 | Central |
| ,, | 101 | 178. | 31.75 | 132/46 | ,, | 163* | 185. | 66.67 | 135/50 | 1250×250 | 314 | 250. | 80. | Central |
| ,, | 196 | 178. | 55. | Central | ,, | 169† | 185. | 55. | 135/50 | ,, | 154 | 304.8 | 101.6 | Central |
| 600×100 | 188 | 120. | 34.92 | Central | ,, | 177 | 185. | 55. | 135/50 | 1500×300 | 305 | 304.8 | 152 4 | Central |
| ,, | 304 | 150. | 38.09 | 104/46 | ,, | 183 | 185. | 55. | Central | ,, | 306 | 304.8 | 101 6 | Central |
| ,, | 333 | 120. | 34.92 | Central | ,, | 211* | 185. | 60.32 | 135/50 | 1525×325 | 197 | 304 8 | 101.6 | Central |
| 700×100 | 77 | 178. | 44.45 | 132/46 | 1000×150 | 167 | 185. | 55. | 125 60 | 1750×300 | 139 | 400. | 152 4 | Central |
| ,, | 92 | 185. | 55. | 135/50 | ,, | 174 | 250. | 80. | Central | ,, | 191 | 350. | 150.3 | Central |
| ,, | 95 | 185. | 55. | Central | ,, | 182 | 185. | 55. | Central | 1750×350 | 193 | 400. | 125. | Central |
| ,, | 99 | 178. | 38.89 | 132/46 | ,, | 187 | 250. | 66.67 | Central | 2000×450 | 363 | 500. | 152.4 | Central |
| | | | | | | 201 | 185. | 60.32 | 125/60 | | | | | |

*Wheels Nos. 161, 162, 163 and 211 are of stronger type than the other wheels for 800×150 tyres. † Wheel No. 169 is fitted with Ball Bearings.*
*Grease gun equipment is now a standard fitting on all wheels.* (A/NL)

## THE PALMER TYRE LIMITED,

Contractors to the Admiralty, the War Office, and the Air Ministry,

Telegrams:— "Tyricord, Cannon, London,"

100-106, CANNON STREET, LONDON, E.C.4.

Telephone:— Mansion House 6530 (9 lines).

(603)

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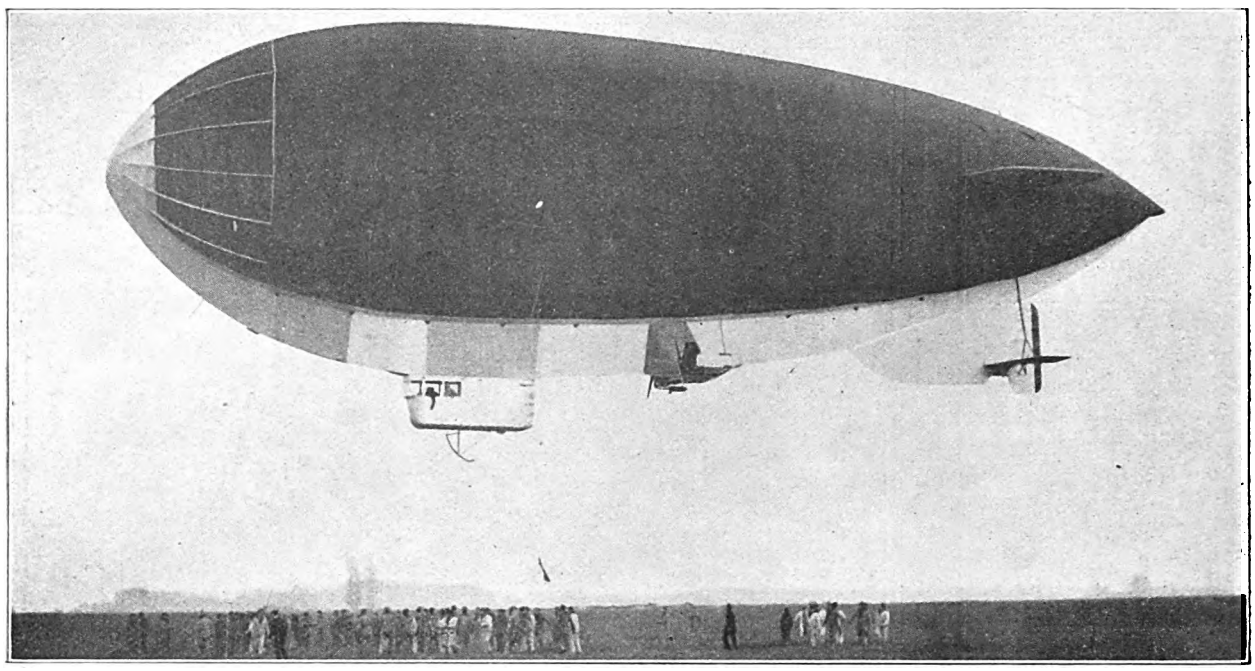

**EN VEDETTE.—One of the recently-developed small scout airships corresponding to our War-time Blimps, which are being developed by the French Navy. The U.S. Navy also uses airships in this class. We in this country who originated the Blimp class have given them up entirely, and have thus lost an excellent and cheap way of training airship crews, besides losing a useful type of sea scout.**

## THE RECLUSE.

R.101 still lurks behind closed doors while the inclemency of the weather prevents any attempt to move her therefrom. Handling parties are being held in readiness as the officers of her crew are anxious to begin the trials at the earliest possible moment.

After 24 hours in the air, and if nothing further develops to prevent her departure, the voyage to India will begin as soon as possible. Lord Thomson of Cardington, Secretary of State for Air, intends to travel in the airship on her trip, which is expected to occupy about five days. A halt will be made at Ismailia, Egypt, for refuelling and the duration of the stop will depend somewhat on weather conditions, and on the behaviour of her new engines and new envelope. A full report of the weather along the whole route cannot be issued at the start of so long a journey, so the airship will set off when conditions promise reasonably well for the first half of the trip.

A motile stub-mast is being prepared, with all necessary appurtenances for moving the airships in and out of their sheds in any weather short of fresh cross-winds, so R.101 may not have to wait in her kennel in future.

## R.100 IN DRY DOCK.

With a naval paying-off pennant flying from the chandelier the crew of the R.100 celebrated their Canadian flight at a private dinner in Bedford on Sept. 27. The R.100 is going out of commission, presumably during alterations, and the crew go on the reduced scale of pay prescribed while the ship is not flying.

Meantime we can only hope that the time may not be long before the good ship R.100 is recommissioned and puts to air again. If only her own designers and constructors were allowed to modify and improve her without official interference she might yet do the first British Round-the-World trip, or she might even represent us at Buenos Aires in March next,—which would be excellent if the Admiralty refuses to send an aircraft-carrier.

But there is the ever-present risk that official experts, with fancy envelopes and stretcher-bars and funny things may ruin her entirely.

## WHERE IT RAINS INDOORS.

From the U.S.A.:—

If you ever feel so dissatisfied with the weather that you'd like to make some of your own, all you need to do is build a gigantic airship hangar such as the Goodyear-Zeppelin Corporation has built at Akron, Ohio, for the enormous dirigibles it is constructing.

This hangar, which is 190 feet high and 1,100 feet long, and contains 45,000,000 cubic feet of atmosphere, makes its own weather without any regard to what is going on outside.

C. H. Barnstorf, Goodyear photographer, discovered this the other day when he went to the hangar to take some photographs. It was a bright, sunshiny day, hardly a cloud in the sky. He stepped inside the hangar and found that it was raining,—raining, and there was a dense fog.

When Barnstorf had persuaded himself that he wasn't seeing things, he asked the company's scientists for an explanation. And he learned that the hangar is so big that it creates its own weather conditions inside. On this particular occasion warm and moist air had been rising from the floor, where men were at work, to the distant ceiling, where the air was cold. There the moisture condensed and fell to the floor as rain; and as the thing kept up the air became full of moisture, and there was a fog in addition.

Goodyear-Zeppelin scientists say that it could snow inside the hangar in just the same way. And if the whirling, unaccountable air currents were to grow a bit stronger the hangar could house a severe windstorm when the air outside was perfectly still.

## A FRENCH LIGHT AIRSHIP.

Two classes of airships are being developed by the French Navy: "*Vedettes*" of 123,500 cub. ft. (3,500 cub. m.), which are small short-range craft for coastal reconnaissance; and "*Escorteurs*" of 353,200 cub. ft. (10,000 cub. m.), for convoy purposes.

The semi-rigid type has been chosen for these experiments and the first of the *vedette* class has successfully passed her trials at Orly. She was designed and built by the Société Zodiac, of Puteaux, Seine,—one of the pioneer firms of French aeronautics.

The Zodiac V.10 is a semi-rigid, with two 120 h.p. engines, carries a crew of four and has a nine-hour range. The top speed is 62 m.p.h. (100 km.p.h.).

The envelope, of 3,400 cub. m. capacity, has a length of 46 m. and is in the form of two banana-like lobes.

The suspension rigging is carried to a rope running fore and aft along the division of the two lobes and to two similar ropes running along the outside of each lobe.

The envelope is divided into three gas-tight compartments by two transverse bulkheads, each compartment having a ballonnet. Each has an air-valve and gas-valve.

The air-pressure in the balloonnets is supplied by an opening in the nose through which air is forced to the ballonnets by the passage of the craft through the air.

A triangular girder structure with ball and socket joints runs from the nose-cap right aft to the tail, along the bottom the hull and forms the keel. The keel is braced internally to the upper ridge rope and externally to the two longitudinal side ropes.

The streamlined observation car is carried below and about one-third of the way along the keel from the nose. It communicates with the engineers' compartment through a passage-way in the keel.

The engineers' compartment is in the keel slightly aft of the midship position. The two 120 h.p. Salmson A.C.9 engines, driving tractor airscrews, are carried in nacelles supported by outriggers, which serve also as a cat-walk from the engineers' compartment to the engines.

The fuel tanks and mooring tackle are carried in the keel.

Three fixed stabilising fins are fitted. Two are horizontally placed on the centre-line. The third is a vertical fin built as a continuation of the keel structure. To this fin is hinged the single rudder, and towards its bottom edge are mounted the horizontal control-surfaces, consisting of a small fixed plane braced to the keel, and normal elevators.

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# Challenge International de Tourisme 1930

4,700 MILES CIRCUIT OF EUROPE

# THE MOST SUCCESSFUL BRITISH FLYERS CHOSE

BRITISH

# K·L·G

PLUGS

## Miss W. E. Spooner

flying a De Havilland Moth with 120 h.p. Gipsy II engine, who was first in the "heavy" category, and fourth in the entire competition, says:—

"You will be interested to hear that during the whole flight of 4,760 miles in the recent International Challenge de Tourisme I used the same set of K.L.G. Plugs which gave me complete satisfaction, and were only removed once during the whole flight for the adjustment of the points. The same set were also used for the starting and petrol consumption tests."

(signed) Winifred E. Spooner.

Messrs.

## De Havillands' say:

"Both Capt. Broad and Mr. Butler used K.L.G. plugs throughout the recent European tour and, so far as I am aware, forgot their existence, as instructed by one of your famous advertisement slogans."

CAPT. BROAD (D.H. Gipsy II Moth) first in speed and reliability, won eight prizes in all.

MR. BUTLER (D.H. Gipsy II Moth) who was level with Capt. Broad up to Poznan, secured three prizes for his performance, prior to the disqualification due to a slight mishap beyond his control.

The Makers of

## Cirrus Engines say:

"The fact that a Hermes engine was fitted in one of the first three machines to finish the tour, and that two Hermes engined machines gained full marks for regularity and fuel consumption is extremely satisfactory, and of course the K.L.G. Plugs gave the high efficiency that is only to be expected from them."

MR. THORN, flying a Cirrus-Hermes Avro Avian, one of the first three to reach Berlin, secured full marks for regularity and fuel consumption.

K.L.G. SPARKING PLUGS, LTD., PUTNEY VALE, LONDON, S.W.15.




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**AT THE MOTILE MAST.—The "Graf Zeppelin" at Lakehurst. A U.S. Navy Blimp is seen above.**

## ADVICE TO THE CREW OF R.101.

By P. L. Teed.

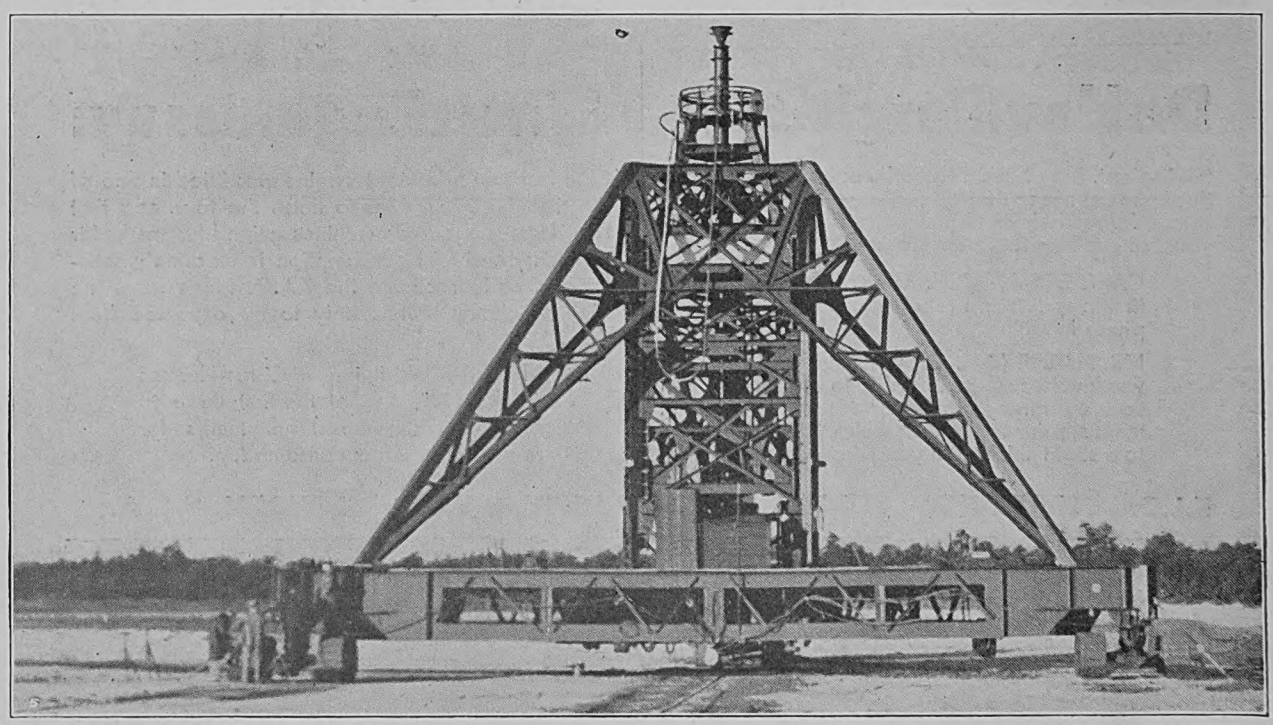
If one were writing a description of an airship flight to India, say in R.101, there are many authorities whose works might be consulted, for while the vehicle of travel is novel, the route, or rather portions of it, have received distinguished treatment from various authors during the last 2,000 years. Herodotus, Marco Polo, and Huc and Gabet, all had extensive travelling experience in either the Middle or Far East, so their books, while of very unequal merit as regards entertainment, ought to help the would-be writer as to the form such a narrative should take.

Herodotus, who to some is the Father of History, while, to others, he possesses the characteristics of a classical Edgar Wallace, made many journeys in the Middle East, yet he never has anything to say about *how* he journeyed. He was a traveller in order to be an historian, so, though his history is enlivened by personal observations in the manner of the most racy of modern autobiographists, with regard to the incidents of travel he is unfortunately silent.

One, amongst his sea voyages, like St. Paul's, may have been brought to an exciting close by the casting of fourteen or more anchors out of the stern. The start of another may have been enlivened by an entertaining exchange of compliments in Jacobslike vernacular, between the Captain and the Harbour Master. Another trip may not have been devoid of scandalous incident, which he could have described with his usual admirable zest, but alas! this great dramatic writer is regrettably silent about such things.

In an account of a flight to India, Herodotus can of course be discreetly quoted to give an historical background to what might otherwise be a plain and uninteresting statement of times, towns and distances, but he provides no real guidance about how such a work should be written, save in two respects. He well knew how to be informative without being dull and he was always careful to differentiate between what he himself observed and what was related to him,—a valuable hint, for, although archery is almost defunct, drawing the long bow is by no means dead. Simple seamen's yarns are generally well-nigh incredible, amiable airmen's may be equally unbelievable.

The second possible guide, Marco Polo, was a traveller



**THE MOTILE MAST.—The stub mast on motor caterpillars which has been built in America and may be adopted by our airship people.**

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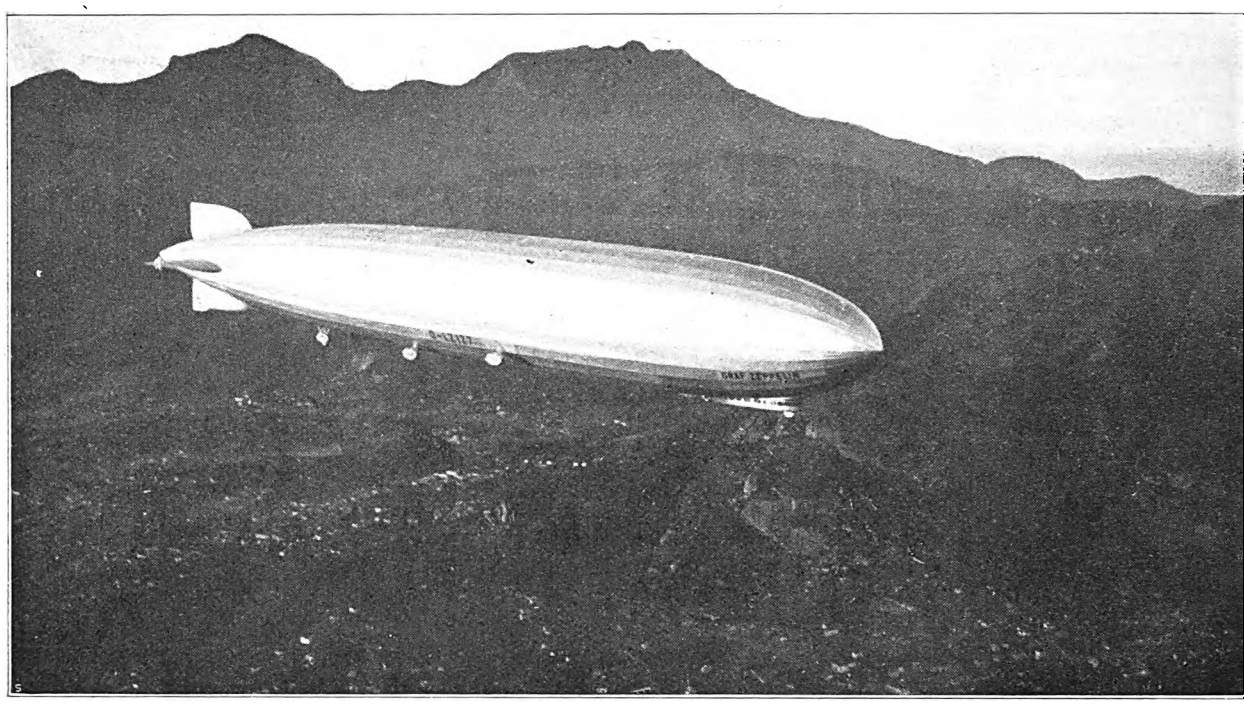


THE FIRST TRIP TO SOUTH AMERICA.—The "Graf Zeppelin" near Rio de Janeiro.

comparable in the length of his journeys with such giants of mobility as the Emperor Hadrian and our Empire-voyaging Prince. But as an author he is a dull, though an excusably dull, dog. He dictated his story some years after the occurrence of its events, which, in some measure, explains its small literary merit. Further, during the period of dictation, he was in prison, which, Italian prisons being what they were in the 13th century, not unnaturally had a restraining influence on his wit and whimsicality.

In other circumstances he might perhaps have been a Barrie. In those in which he wrote, he was in fact an inaccurate Baedeker. As with Herodotus, the adventures of travel are as nothing to him. He is dominated by the idea that he must be geographically informative. He crosses half the world, but does not mention the weather. He meets historical characters, yet he can do little more than give an account of their possessions. In a word, his book is but a list of places, pomps and puppets.

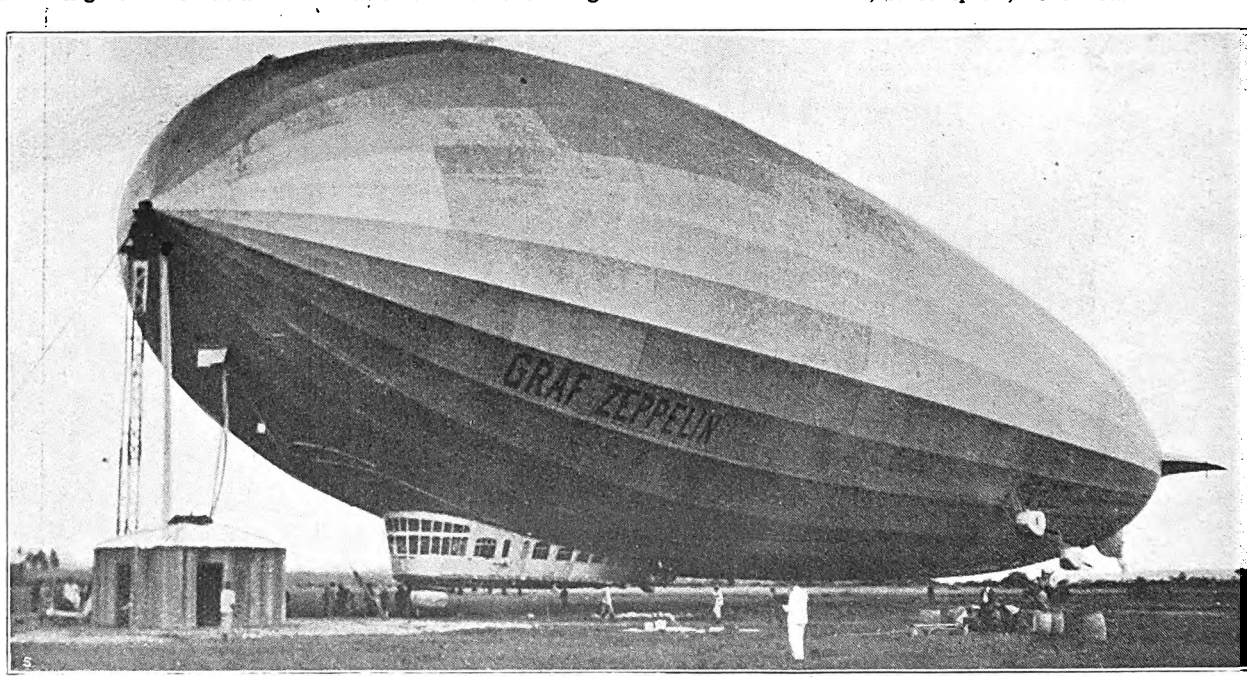
On the other hand, Huc and Gabet, the Lazarist Fathers, are a real help. By blending with skill and artistry descriptions of places and people with accounts, not by any means lacking in humour, of the vicissitudes they inevitably suffered, they have produced a story of vital interest, mellowed by the charm of their genial and heroic personalities.

Their high resolve was a determination to make the Mongol World take to Christianity, but they were not above mentioning that they themselves could not take to sheeps' tails cooked in the Tartar manner. They describe the immense difficulties of their journey to Lhassa, but they equally describe the minor discomforts of wearing secondhand clothes whose former owners were by no means too cleanly.

They discuss high theology with the Regent of Thibet and while they show him something of the Life to come, they do not neglect to improve his vision of mere earthly things, for turning from the future to the somewhat insistent present, they show him a louse (also of the company) under a microscope.

They really are masters of the art of travel writing and should be an invaluable guide to anyone venturing into this field. However, airships having such a marked tendency to produce the humorous anti-climax, some lighter work might well produce helpful analogies. Experience of lighter-than-air trials suggests that no writer on this subject should fail to provide himself with some such literary soufflé as "The Hunting of the Snark," for lines like the following are almost certain to be useful:—

"Then the bowsprit got mixed with the rudder sometimes;
A thing, as the Bellman remarked,
That frequently happens in tropical climes,
When a vessel is, so to speak, 'Snarked.'"




A SOUTH AMERICAN STUB.—The temporary mast to which the "Graf Zeppelin" was moored at Pernambuco.

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# A SHORT DEBUT.

On Sept. 22, the World, as represented by the technical and lay press, saw yet another of the long line of Short water-aircraft make its bow. The Valetta is a normal-looking monoplane with three Bristol Jupiter XI.F. engines (geared), but it is the outcome of a pet theory of the Short Brothers, and Mr. Oswald Short in particular, that the twin-float seaplane could perhaps rival the hitherto supreme flying-boat of large size. So the Valetta weighs nearly 11 tons, all up, and is the largest float seaplane in Europe at least, and probably in the World. It was described technically in The Aeroplane of July 23.

The performance of the new seaplane on that Wednesday afternoon suggests that the experiment will justify itself most sweepingly, for the Valetta eclipses its estimated performance and is appreciably better in practically every respect than its flying-boat rivals of equal power.

Comparison with the Calcutta, which uses three similar engines, is fair, and was probably intended. The Valetta weighs 14,535 lbs. empty; the Calcutta 12,800 lbs. The all-up weight of the Valetta is 22,400 lbs. against 20,500 lbs. for the flying-boat.

With full load the Valetta cruises at 110 as a seaplane, climbs 850 ft. per minute, and has a top speed of 135 m.p.h. All these figures are better than those of the Calcutta.

The great advantage of the Valetta is, however, that the floats can be removed and replaced by wheels, with a corresponding increase in performance. Each float has a displacement of 22,500 lbs. and the pair weigh 840 lbs. They are practically 40 ft. long. When a transport firm can get a float seaplane of high performance for its over-water stages, and use a similar machine on wheels overland, the equipment and maintenance problem is simplified considerably.

While the party were arranging themselves to watch the trials Mr. Eustace Short took off in the little Short Mussel which has just been fitted with a Gipsy II engine. The take-off was remarkably quick and the higher power gives the machine a much more impressive performance. There is good stuff in the Mussel, as it floats happily on the bosom of the Medway, month in and month out without visible change. Mr. Short flies the machine from the front seat, perhaps for better ease of picking up moorings, which he does single-handed with great aplomb.

Meanwhile the Valetta was loaded up with twelve interested passengers and they were allowed an interval for inspection and meditation. Later Mr. Lancaster Parker followed and saw that they and the ballast were comfortable before starting the engines. There is quite an impressive amount of tackle and equipment stowed in the spacious fuselage aft of the cabin; mostly mooring and refuelling gear.

The Bristol gas-starter worked admirably, and the three engines came to life with beautiful ease. Mr. Parker taxied the Valetta up and down the river, warming the engines and showing off its paces to the camera squad. Partly by reason of its wide-track floats apparently, it turns in shorter radius than a flying-boat by the use of either wing engine.

The take-off was very fast for a craft of such size and was variously estimated by the non-stop watches of the onlookers as 15 to 18 seconds. Mr. Parker did not pull her up steeply but she gained 2,000 ft. very quickly.

The proof of her generally nice proportions is that she loses the effect of her great size when in the air, and her speed naturally helps in this. Seaplanes on floats, however large, have not the sedate majesty of big flying-boats, nor their sheer beauty of line, and the Valetta, clean job though she is, is not outstanding in the matter of contour.

The floats run exceptionally cleanly, and the passengers are both isolated and insulated from the noise of water which is so noticeable in the hull of a flying-boat. Mr. Parker's alighting was a thing of beauty.—F. D. B.

### Inside and Aloft.

There is nothing cramped about the cabin of the Valetta. The chairs for 17 passengers are arranged in six pairs down one side and five singles on the other, and they are completely comfortable chairs. The cushions are air, I think, and they say can be used as lifebelts, which is cheering, but they are good to sit on and the backs and arms are really fine. The windows are large and slide open quite easily.

The cabin is neatly done in grey grained panelling and there is grey corduroy on the seats under the dust-covers. The one blot, from one woman's point of view, is the little blobs and tassels on the curtains which don't go quite with the general dignified effect. Each window has its little pair of curtains—with blobs.

There is an altimeter, an air-speed indicator and a clock for the use of the passengers.

We took off and climbed quickly to about 2,000 ft. The three Jupiters made a muffled roar, rather more muffled than in a three-Jupiter Fokker, and the vibration was hardly noticeable at all. I am told that the engines are bedded with rubber insulation, which probably helps, but one can quite imagine making very long journeys in the Valetta without any fatigue. We could talk without unduly raised voices, and what noise there was seemed lower in pitch than in most machines.

We were told later that the geared airscrews make that difference by running more slowly. It is a big improvement anyway.

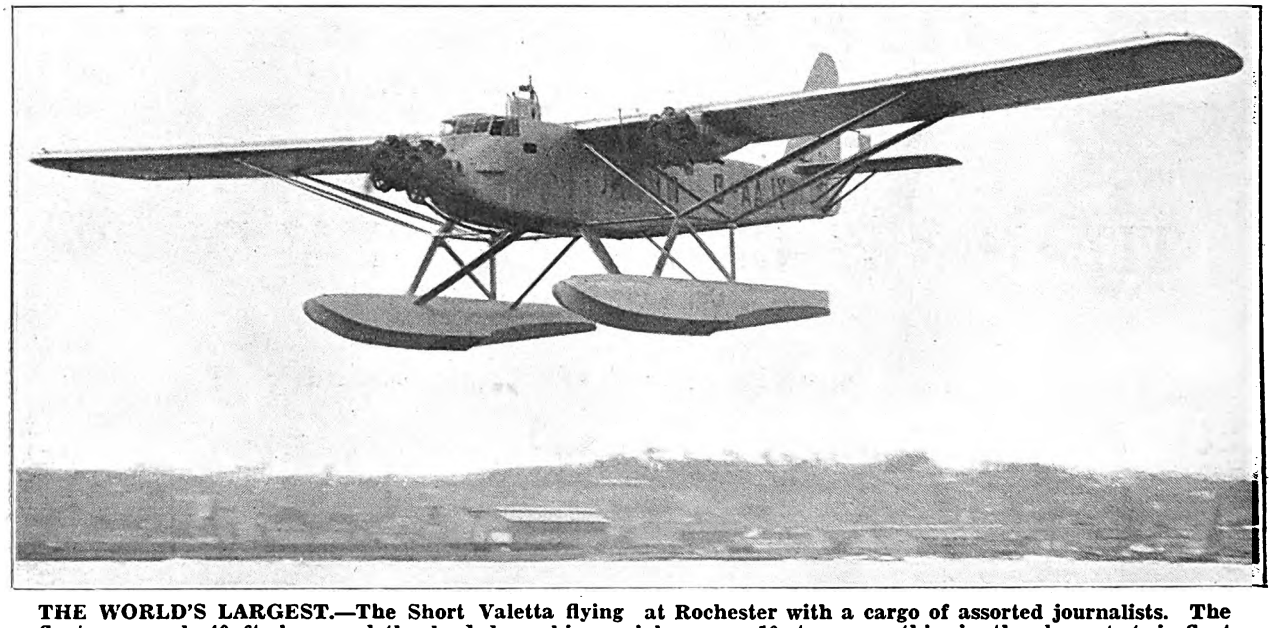
The visibility was excellent; much better than one expected, as there is a mass of struts amidships, but they did not interfere much with the interesting view we had of Chatham Dockyard.

We cruised round for about 30 minutes at 110 m.p.h., and dived down once or twice in front of the photographers on the wharf. Gliding in to land the air-speed showed 70 m.p.h., but the landing was the smoothest I ever experienced. Except by watching the water under the float we could not tell when we stopped actually flying and began floating.—J. B.

### The Service Calcutta.

In the cool of the evening, before the tide ran quite out, the first of the new Service Calcuttas was launched from the slipway and Mr. Parker took her off for a maiden flight.

The usual variations distinguish her from the commercial Calcutta:—gun-rings and a Spartan severity of ap-



**THE WORLD'S LARGEST.—The Short Valetta flying at Rochester with a cargo of assorted journalists. The floats are each 40 ft. long and the loaded machine weighs over 10 tons, so this is the largest twin-float seaplane.** —(*"Aeroplane" photograph.*)

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pointment inside. She has a cabin over the cockpit, though, which seems to indicate that sometimes the asceticism of the Service has its limits. Her flying structure is just as in the commercial model except for extra tankage in the lower wing which raises the normal cruising range of 870 miles to 1,500 miles in emergency. The normal crew is six.—F. D. B.

[Rumour in London, though not in Rochester, has it that a squadron of these boats is to go to Basrah for duty against gun-runners and slave-runners in the Persian Gulf. Probably an awning rather than a glass-house for the pilots will then be fitted.—Ed.]

## AUTOGIRING HERE AND THERE.

On Sept. 21 Mr. A. H. C. A. Rawson, chief test pilot for the Cierva Autogiro Company Ltd., left Lympne for Cologne in the autogiro G-AAYP. His passenger was Mr. Reginald Blake.

The weather was not particularly good, but the flight was wholly uneventful. German interest in the autogiro is rather high at the moment, and there were demonstrations at the Tempelhof under the auspices of the *Deutsche Luft Hansa*.

In the United States, where the autogiro is built by the associate concern, the Pitcairn Cierva Autogiro Company of America, Inc., a demonstration was recently given to Mr. Thomas A. Edison, who appeared at the aerodrome and requested it. He was immensely impressed with the points of the machine, and is alleged to have said, on alighting after his flight, "The Autogiro is the Answer." He also expressed his intention of interesting himself in its development and giving it support.

The Autogiro which Mr. A. H. C. A. Rawson flew round Germany attracted a great deal of interest in Berlin. One of the pilots who has flown the machine is Herr Udet who expresses himself as being much impressed with the possibilities of the type, but presumably not for his own speciality of aerial clowning. Before returning to England the Autogiro is to go to Bremen.

On Aug. 5 Senor Don Juan de la Cierva left Croydon in an Autogiro to fly to Paris. He reached Le Bourget on the following day after having been forced to land at Lympne, Abbeville and Poix by bad weather. His final descent, of the almost vertical type, was made into Le Bourget at 21.15 hrs. in darkness.

Senor de la Cierva gave several demonstrations both at Le Bourget and at Villacoublay, where the machine was put through a series of tests by the French Air Ministry officials.

On Aug. 11 he flew from Paris to Bordeaux and gave demonstrations at Tours, Poitiers, and Angoulême. Reports state that the machine was received enthusiastically. Further demonstrations were given at Bordeaux and Biarritz.

On Aug. 12 the Autogiro landed at San Sebastian and on Aug. 13 arrived at Santander where the machine was demonstrated before H.M. The King of Spain.

Señor de la Cierva was still at Santander on Aug. 22. He had been giving demonstrations on his Autogiro every day, and the makers say that in consequence of them he has received many orders for this machine, which, they claim, will become one of the most popular privately-owned planes in Spain.

The second son of the King of Spain, Prince Jaime, has become one of his most enthusiastic pupils, and expresses himself as tremendously impressed by the improved performance of this latest Autogiro.

Señor de la Cierva stated that he was preparing to cross the Pyrenees to Madrid in the course of the next few days.

## ROLLS-ROYCE ENGINES FOR THE UNITED STATES.

The United States Navy Department has bought three Rolls-Royce "H" type 12-cylinder water-cooled aero-engines,—presumably for experimental purposes.

The remarkable achievement of Rolls-Royce Ltd. in producing the "F," "H," and, from the latter, the "R" engines, in such a comparatively short time has greatly impressed aeronautical industrialists all over the World. The success of the "R" engine in the 1929 Schneider Trophy was one of the most outstanding accomplishments of design and construction that has ever been seen.

The 850 h.p. "H" engine represents a class of heavy-duty engine that is not in a high stage of development in the United States. Service aviation in the U.S.A. has of recent years used almost exclusively the air-cooled radial engine, but lately there have been indications that there is likely to be a big swing-over to the water-cooled engine, using recently-developed cooling fluids which will largely offset the earlier disadvantages of the water-cooled engine.

The fact that the U.S. Navy have decided to investigate the merits of the Rolls-Royce engine of the latest design is a great tribute to Rolls-Royce Ltd.

## THE WESSEX AT HANWORTH.

The business-like Westland Wessex will appear to the interested public at Hanworth on Saturday and Sunday, Oct. 4 and 5. The latest model of this interesting machine has three Genet Major engines of about 110 h.p. each and its performance is such as to commend it for fast work on regular commercial lines, air-taxi service, and as a luxury machine for the private owner.

Flt. Lt. Louis G. Paget, chief test-pilot of the manufacturing firm, will fly it in demonstration from 14.30 hours on Saturday, during daylight hours until Sunday evening.

## DYNAMIC EMPHASIS.

The inspired High Priests of Terrible Taste threaten to inflict on unoffending Britons the latest in red-hot publicity methods from its inevitable home. Advertising by loud-speaker from aircraft is to be introduced from the United States under the awful and wonderful name of Dynamic Emphasis. We have seen loud-speakers on English aeroplanes, and heard of their use trans-Atlantically with some wonder and amusement, but the latest foreboding cancels the amusement and promotes shudderings of alarm.

We like advertising. We live on it. And we deplore its tendency to be stodgy and unæsthetic. We think it ought to be dynamic and emphatic—but on nice, well-printed paper, like that of The Aeroplane, where the well-impressed may linger over it lovingly until moved to buy, and the disinterested may pass over it without being helplessly goaded to frenzy and murderous campaigns of boycott.

There is a widespread, most British, and quite intolerable habit of commercial nonchalance which causes hair to rise on the spines of would-be customers and sends them ague-stricken to foreign merchants from whom they may buy without weary months of cajolery and a stomach-pump. We deplore that too, but it has at least the virtue that it will probably frown on Dynamic Emphasis.

There have been those who objected to the pollution of London's sky by the distant smoky wisps of sky-writing, tenuous and evanescent besmirchings that none need see unwillingly, but we foresee with a certain grim joy a dwindling rather than growing profit account for any firm which blares forth the claims of its soap in the helpless ears of England's millions. Such tactics will merely ensure that the audience insists on its right to wash when it jolly well pleases and, under provocation, not at all.—F. D. B.

**A SUNDAY ARRIVAL.—The Autogiro (Genet) which Flt. Lt. A. H. C. A. Rawson demonstrated at Norwich on the second day of the Mousehold Brigade's Meeting. It got third in the balloon-bursting contest.**

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# fly to success on BP SPECIAL

**King's Cup Air Race & Siddeley Trophy**
Miss Winifred Brown (Avian) - 1st
Flt./Lt. H. R. D. Waghorn (Bluebird) 3rd

**Hanworth Air Race**
Capt. Percival (Hendy 302) - - 1st

**International Air Race**
Miss W. Spooner (Moth) (general class) 4th
(heavy 'plane class) 1st

**Newcastle Air Pageant Handicap Race**
F/O H. H. Leech (Desoutter) - - 1st

**Bedford Air Pageant Handicap Race**
Mr. F. Gough (Avian) - - - 1st

**ALL ON BP SPECIAL**

For all standard light aeroplane engines, the New B P with its scientific blend combining lighter fractions, heavier hydrocarbons and high overall volatility is the ideal fuel. For special engines B P Special gets winning results. Do as experienced pilots do—fly on B P.

**WHAT B P DOES FOR OTHERS LET B P DO FOR YOU**




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# CORRESPONDENCE

## WHY AND WHY NOT.

The following letter is an excellent example of the kind of thing that manufacturers are up against. The writer of the letter is unknown to the staff of this paper, but he is evidently the typical young man in a hurry who has a certain amount of knowledge, but not quite enough. His letter may be taken point by point, and, to make references to those points easier, numbers have been added in his letter at the points concerned.

Sir,—An idle chat at Thursday's lunch to Miss Spooner on the question of why the British public so far declines to buy light aeroplanes in anything like large quantities leads one to the following reflections. They are based on three years' study of the average member and the average visitor at one of our Light Aeroplane Clubs.

There seem to be three answers to the question:

The first is the high cost of purchase and maintenance, and this is, no doubt, due to the fact that no manufacturer has yet thought it worth while to get down to real mass production methods. (1.)

The second is the impression of the man in the street, that the aeroplane is still too unsafe a vehicle. This may be fostered by newspaper headlines; but it is mainly due to the fact that so few of his friends are taking up the art and using their own machines. Reverse that state of affairs and the impression will vanish. (2.)

The third reason is generally put last, but is more fundamental than either of the other two. It is the conviction that flying is a difficult thing to learn, and, whatever club officials or aircraft salesmen may say, the conviction is sound. It does take much longer to learn to get about in an aeroplane than to get about on skis, skates, bicycles or automobiles, and it takes much longer to learn to fly to-day than it did twenty years ago. (3.)

Possibly an underlying cause of the slow development of this market is that so many of our light aeroplane designers concentrate on producing a machine which can be stunted in every possible way. Presumably Martlesham tests revolve round this aspect—at any rate, every public exhibition of a new type is devoted to it. Now, ninety-five per cent. of the utilitarian market has no use whatever for stunting and would refrain from buying a machine if told that aerobatic considerations had hampered in any way its adaptability to simple and safe point-to-point flying. Take a referendum, Mr. Editor, of the 300 odd private owners and see how many of them use their machines for any form of stunting. (4.)

Why does not some manufacturer get down to the production of a machine which—

(1) will taxi, take off and land with the fuselage in the horizontal or "flying level" position. This would immensely simplify that bugbear of present-day tuition—the art of landing—in addition to giving the pilot the maximum forward view while on the ground. (5.)

(2) like a car, requires the use of one control only in turns. This means that the application of this control (say the rudder) would automatically put the machine into the correct amount of bank. It also assumes that banking will always be essential to turning and that the flat turns so beloved by Kronfeld and Magersuppe will never become common in powered flying. (6.)

(3) is fitted with the fullest development of the air brake principle, to make it easy to land on windless days or into small fields and to render unnecessary the trick and risky manœuvres of side slipping and swish tailing. (7.)

Of course, one assumes that within a very short time all machines turned out will be fitted with wheel brakes. Present-day designs, which leave the machine to be pulled up on the ground by the reaction of the air on a craft made to offer the minimum of air resistance, are just too crude and clumsy for words.

With a design as outlined above, the ordinary man could buy a machine, could learn to fly it on one hour only of dual and after a further two hours' solo practice could safely be left to fly it to his home—always assuming, of course, that the designer has allowed him sufficient forward view to entail no greater risk of collision with other vehicles than pertains with the ordinary car. Then the market will move. (8.)

(Signed) Private Owner.

(1) Mass production must not be confused with cheap production. Our most expensive war machines are specially designed for mass production in case of war. But mass production in light aeroplanes would only produce a mass of unsaleable machines. Design for cheap production is another matter, and here there certainly is room for much improvement in the aircraft of all nations. The real trouble is that there are not enough people yet who are ready to fly, and have enough money to fly at the cost of running, let us say, a decent kind of sports car. For remember the owner of an aeroplane must have a car as well to act as a tender. What is really wanted is a campaign to convert the well-to-do people to the use of family limousines in the air. There are far more saloon cars on the road than sports cars.

(2) The danger of flying has very little to do with the sale of sporting light aeroplanes, but it has a great deal to do with the sale of limousines. And quite definitely flying is too dangerous still for family flying. But designers of aeroplanes all over the World are entirely to blame for the fact that it is dangerous. With the knowledge which exists to-day an aeroplane could be built which would be actually less dangerous than is driving a fairly fast car on the road.

(3) The writer of the letter is talking sheer nonsense. A man or a woman of ordinary intelligence can learn to fly moderately safely very much quicker than he or she can become a good car driver or a good skier or a good skater. Learning to balance a bicycle may not take as long as learning to balance an aeroplane, but to be safe on a bicycle in modern traffic takes a good deal longer than to be fairly safe in a modern aeroplane.

(4) An aeroplane that cannot safely be stunted is unsafe to fly under any conditions. There is always the likelihood that the only way to avoid a crash may be by a manœuvre which overloads a machine as much as stunting does.

(5) This would involve wings of variable angle and the use of slots as they should be used. It is asking too much of aeroplane designers for the next four or five years at least.

(6) This again displays ignorance. An unbanked turn in any vehicle is one of the most uncomfortable things in life. Furthermore, a vehicle which moves in three dimensions must necessarily be controllable in all three dimensions. A car which manœuvres in two dimensions only has to have two controls (the wheel and the brake) to match.

(7) Such things are being developed, albeit slowly.

(8) The writer is a bit too much of an optimist.

## FLYING-BOATS AND BULLETS.

The following letter may, or may not, console the crews of flying-boats:—

Sir,—I have read with interest your remarks on the safety of Flying-Boats in last week's issue of The Aeroplane.

The possibility of loss of a flying-boat through water entering a hole, whether made by a bullet or any other cause, has not entirely escaped designers' notice.

It will be of general interest to readers of The Aeroplane to hear that all modern flying-boats are bulk-headed in such a manner that loss from such an accident would be extremely unlikely.

To give an instance The Saro Cloud is fitted with four watertight bulkheads, dividing the boat into five parts, any one of which can be flooded. This method is applied to our Service and Civil Craft generally.

As temporary repairs can be carried out from the inside relatively easily, owing to all floors being made detachable, I suggest as an alternative to the external collision-mat method of stopping holes in the bottoms of the boats, that a thick sheet of soft sorbo rubber be carried. This can be cut to the desired shape and held in place over the hole by small battens, and strutted to the boat structure. The flooded compartment can be pumped out by means of the pump always carried.

One has heard the pathetic story of the Dutch boy and the leaking dyke, possibly a member of the crew could be spared to act in a similar capacity.

(Signed) H. Knowler,
Chief Designer, Saunders-Roe Ltd.

[No doubt Mr. Knowler is right, but one does not recall seeing any water-tight doors between the forward and after cockpits in any of a number of flying-boats which one has inspected. Possibly watertight compartments aft and in the sides might keep a boat from going right under, but something to keep her afloat at her proper level would be preferable to hanging onto the tail while the midships portion of the boat was under water. Also, something which was kept in place and made watertight automatically by water-pressure outside seems preferable to anything held out against that pressure from inside. Furthermore, a hole in the side, below the waterline, and behind tanks, wireless tackle, or other gear and gadgets, might be hard to reach, and the boat might be flooded before it could be found. Therefore an apparatus which would do the finding and stopping for itself seems preferable.—C. G. G.]

## FOR DISPOSAL.

Mr. J. Franklin, of 80, Station Road, West Byfleet, Surrey, has for disposal one copy of "All the World's Aircraft" for 1926, and one each of "L'Année Aéronautique" for 1927-8, 1928-9 and 1929-30, which he would be glad to exchange for flown air mail envelopes, preferably South American.

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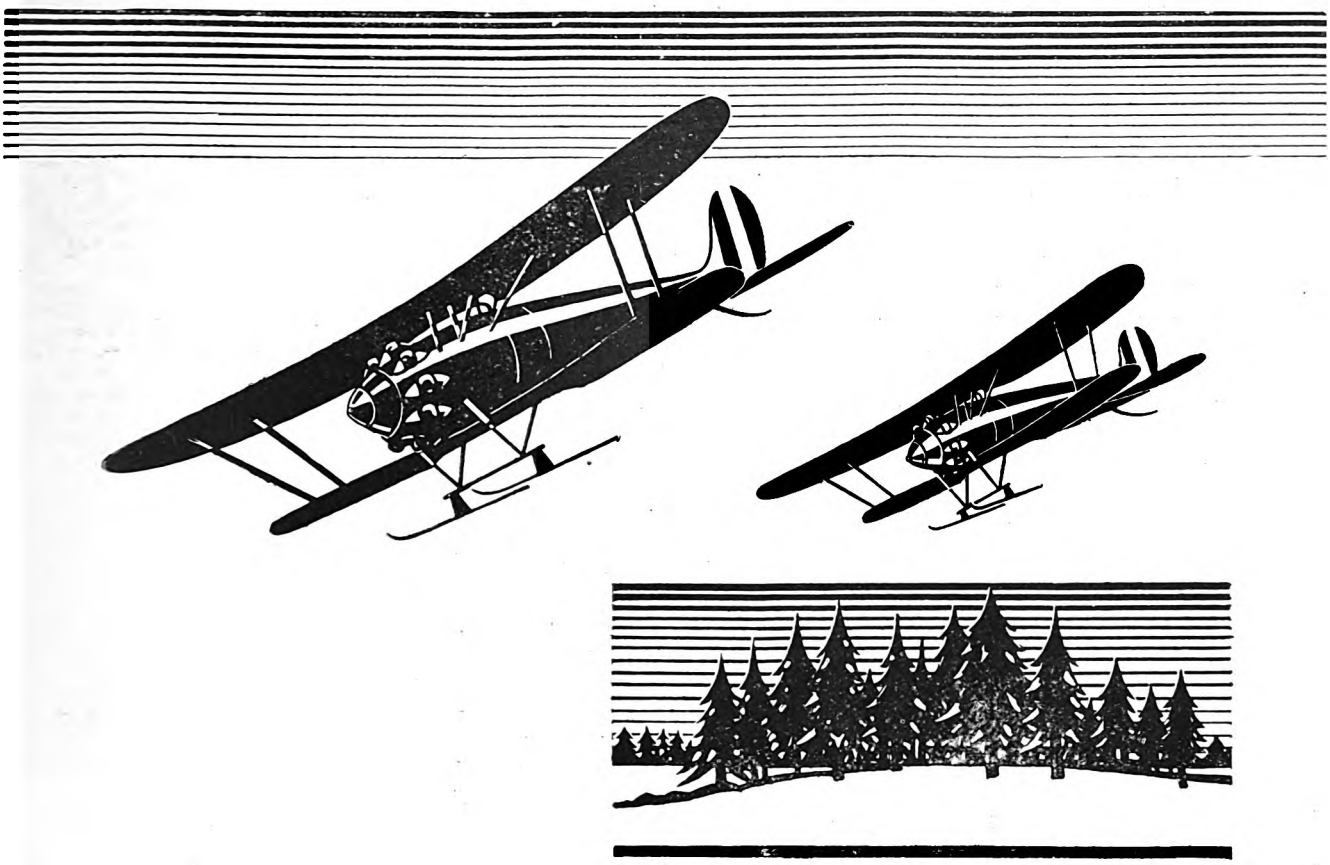

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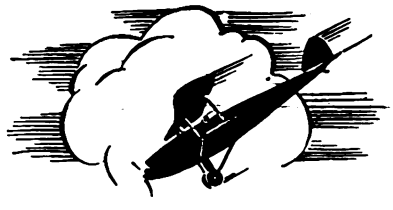

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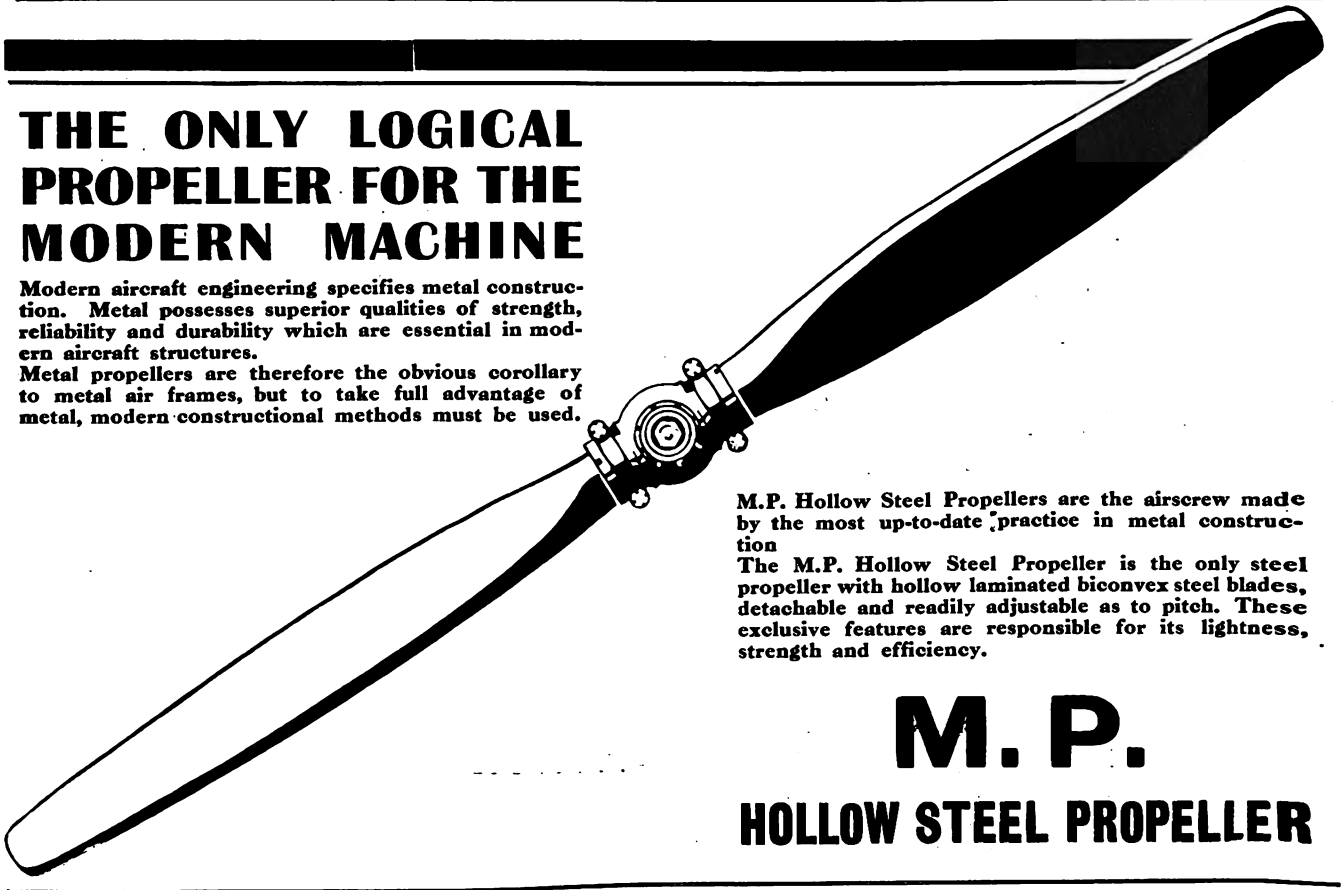

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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### AVIATION DAY AT PLYMOUTH.

On Sept. 25 the Civic Week at Plymouth was rounded out by an Aviation Day under the auspices of the Plymouth Aero Club. This was a decided success both in weather, attendance and entertainment. The crowds turned out beyond all expectations and paid their shillings in much greater proportion than usual. The young idea was especially well represented.

The usual aerobatic turns were given by the standbys, Mr. Hubert Broad on his invertible Moth, Flt. Lt. Tom Rose, Mr. S. A. Thorn, and Mr. R. R. Bentley, who crazy-flew with all his usual abandon. Flt. Lt. Rose and Mr. Bentley made effective use of the young mountain which Plymouth is unfortunate enough to harbour in the middle of its aerodrome, and disappeared from public view for seconds at a time after diving apparently into the ground.

Balloon-bursting, bombing, sharpshooting, and other diversions added to the excitement, and a spice of dignity was added by two Supermarine Southamptons of No. 204 Squadron from Mount Batten, and one Blackburn Iris, presumably from No. 209, which attended by permission of their respective commanders, Sq. Ldr. F. H. Laurence and Wing Cdr. C. G. Tucker.

Flt. Lt. L. G. Paget, of Westland Aircraft, Ltd., effectively demonstrated the Wessex. The bombing was committed on very carefully built model battleships on baby cars, and Mr. Thorn was brutally accurate enough to score a direct hit on one of them.

Mr. Tranum made a good parachute drop from Flt. Lt. Rose's machine, and the police stopped traffic on the roads flanking the aerodrome in case he landed on one of them. The kindly precaution proved unnecessary when Mr. Tranum landed squarely on the field.

A very successful dinner in the evening rounded out a day which ended in distinct success after an unpromising start. A lack of organisation was rather evident to begin with, but the arrival of the experienced and able Mr Jeffs, and the ready eloquence of Mr. E. C. Brown at the microphone, quickly put the necessary swing into the affair.

Joy-riding was a most popular part of the programme after the display events were over, and the eagerness of the crowd nearly caused a tragedy. A lady who had missed her turn ran up to a Desoutter of the Surrey Flying Services, piloted by Mr. Muir, and in dodging someone who tried to ward her off ran into the idling airscrew. She was very lucky to escape with nothing worse than a fractured shoulder blade. The airscrew was broken.

Among the visitors by air were the following:—

Moths (Gipsy), Mr. and Mrs. E. C. Brown; Mr. and Mrs. Bernard Wilson; Messrs. Parkhouse and Broad. Moths (Hermes), Flt. Lt. Rose and Mr. Bentley.

Puss Moths (Gipsy III), Lady Astor and Mr. Lee.

Avian Sports (Hermes), Mr. and Mrs. S. A. Thorn, and Mr. Allen. Avian (Cirrus III), Miss Winifred Brown.

Widgeon (Cirrus III), Mr. Napier.

Desoutter (Hermes), Mr. Muir (Gipsy III), Messrs. Robinson and Jeffs.

Westland Wessex (three Genet Majors), Flt. Lt. Paget.

### THE RODMAN CHALLENGE TROPHY.

The first Senior Pilots' Landing Competition, organised by the Lancashire Aero Club, for the Rodman Trophy and for the helmet presented by Capt. A. G. Lamplugh, took place on Saturday, Sept. 27. The conditions are interesting:—

The pilot is presumed to suffer complete engine failure while flying down-wind at 1,000 ft. directly over the only possible forced landing field. This field is only 500 feet in length and 90 feet in width, flanked by trees but with an apparently clear approach. While approaching, however, the pilot finds that a row of telegraph wires runs across the edge of the field and he is compelled to glide in between the telegraph wires and the hedge. These conditions were reproduced by two white tapes, one twenty feet above the ground and the other five feet above the ground and immediately below it, the tapes being suspended between poles 90 feet apart and the field being marked out by rows of flags.

The competition was open to all approved pilot members with over 100 hours' solo experience, including Service and Country members. The Judges were Flt. Lts. Comper and Massey, and Mr. D. E. Hall, Chief Instructor to the Club. A maximum of ten points each were awarded for style of approach, style of landing, and distance before coming to rest.

The contest was very successful and the majority of the competitors had no difficulty in getting in between the two tapes, although the maximum clearance was only 2½ feet above and below. It was interesting to note, however, that the effect of the two tapes seemed to be that most pilots came in rather too fast so as to make sure of having plenty of control, with the result that they could not pull up before the end of the field. Pilots were allowed to use their own aeroplanes or any of the Club machines at choice and the leading returns were as follows:—

Winner, Mr. A. Goodfellow, 29 points—Cirrus Avian.

Second, Mr. B. A. G. Meads, 23 points—Cirrus Avian.

Third (bracketed), Mr. J. C. Cantrill, 19 points—Gipsy Avian, and Mr. P. T. Eckersley, 19 points—Hermes Avian.

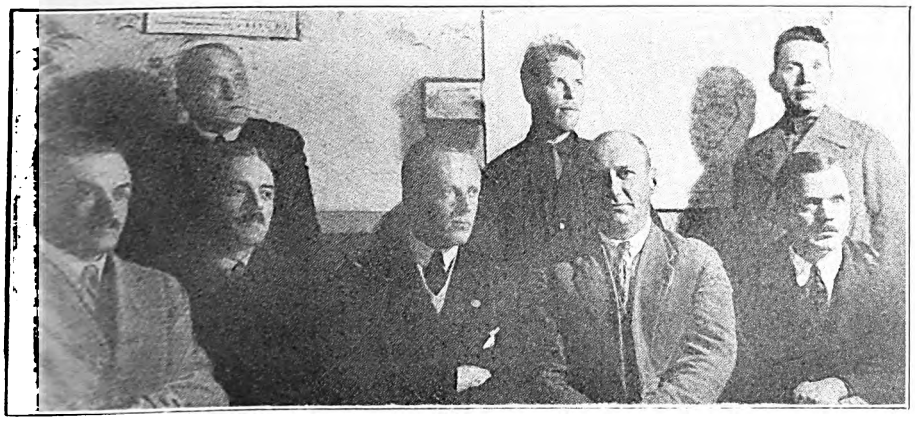
On the same afternoon the Landing Competition for the Pemberton Trophy for Junior Pilots was also held. The conditions were the same except that the telegraph wires were removed, the field was made larger and an Instructor was carried in the front seat. Owing to the strong and gusty wind competitors had great difficulty in judging their approaches and in fact the only competitor to get safely into the field was the holder, Mr. J. C. Garner, who thus retains the Trophy for another three months.

Among the distinguished spectators was Wing Cdr. Kingsford Smith, now a member of the Club, who came to say goodbye before starting out on his flight to Australia in the Sports Avian. Incidentally before leaving he gave a very handsome cheque to the Club, an entirely unsolicited and unexpected act which was greatly appreciated.

### HOME FROM THE BALTIC.

Having completed his tour of the Baltic, Colonel the Master of Sempill flew his Puss-Moth direct from Norway to Scotland, some 300 miles of open sea, on Sept. 22, from Trondheim to Carden Bay, and arrived at his ancestral home near Aberdeen. This was the first flight from Norway to Great Britain. The first flight between the two countries was from Scotland to Norway,—by Mr. Tryggve Gran in 1912.

After staying a few days at home, Col. Sempill flew, on Sept. 25, non-stop from Aberdeen to the Welsh Harp at Hendon,—some 500 miles in 4 hrs. 50 mins. The Puss-Moth kept up an average speed of 100 miles an hour throughout the whole journey.



**A VISIT TO TALLINN (ESTHONIA).—left to right, seated, Sq. Ldr. A. C. Collier, R.A.F. (lent to the Esthonian Air Force); A. H. Halsey, His Britannic Majesty's Acting Consul; Col. the Master of Sempill; N. Wehlmann, in charge of Tallinn Civil Flying Station; and Mr. C. S. Emery, late R.A.F.**

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## IMPRESSIONS OF THE SPARTAN ARROW.

By F. D. Bradbrooke.

The natty little doors which so improve the usually unlovely process of getting in and out of light aircraft are an inheritance from the Arrow's earliest progenitor, G-EBYU, which we had the pleasure of flying in 1928. They help the general air of substantial strength which is a feature of the machine throughout, because they are actual doors rather than flaps of three-ply, and have businesslike handles.

The cockpits are quite unusually comfortable, and give the pilot an upright position, with padding right up to his neck. There are two belts, one round the chest and the other over the thighs, which system is popular in America for aerobatics, and should work well in the severest bumps. It is less cramping than shoulder-straps.

The throttle-lever has an adjustable friction device to prevent it vibrating on or off, but its maximum arc is small, a larger quadrant would feel easier for fine adjustment, probably because it is more usual.

The Arrow gets off with a very short run indeed. Before we had finished watching the tachometer to see what the Hermes II was up to we felt her ready to fly. Incidentally, the Hermes II ran very sweetly at all speeds up to the maximum of 2,000 revs. The new streamlined exhaust pipe on the Arrow, which sweeps downward from the front of the engine and curves rearward, does not please at first, partly because it breaks the clean lines of the nose and partly because it is unusual. However, it is no worse than an unsightly pipe alongside the cockpit and keeps the noise well away underneath the lower plane.

The machine held a climbing speed of 60 m.p.h. at quite a steep angle and gained height rapidly. The exact performance could only be guessed because the heat of the day seemed to be making the altimeter stick.

On the level a speed of something over 95 was reached fairly quickly, but the Arrow cruises faster than might be expected from such a top speed. She does 85-90 m.p.h. in level flight on 1,800 revs., and the whole machine is very happy under just such conditions.

The controls as a whole incline to be slightly heavy, but they are at least very well balanced. There is not the quite usual fault of light fore-and-aft and rudder control with heavy ailerons. The ailerons are lighter than those of many light aircraft, probably because of the horn balances on all four.

Elevator and rudder controls are quite normal and positive in their reaction and continue to answer down to stalling speeds.

The ailerons are particularly effective and good throughout the speed range, which descends to well under 40 m.p.h. at the low end. In fact the machine can be rocked quite positively while hanging on the prop at 35, and if stalled gently without engine until the stick is right back they do not fade out completely. When the machine is thus stalled and the ailerons held neutral the machine drops its nose and starts to spiral downwards without any of the characteristics of a spin.

We did not flick roll from the stall in an attempt to force a spin, but are content to consider a machine fairly safe if it shows absolutely no tendency to develop one normally. We did one loop to see how she held speed, and found that she flew every inch of the way over, after going in at just under 100 m.p.h. Without any ruddering at the top she flew out dead on line.

The landing properties of the Arrow should inspire the utmost peace of mind. She glides very happily at 50 m.p.h., and less after a little practice—and she touches on three points long after the needle has fallen off the air-speed scale. We guessed to Mr. O. E. Simmonds, the designer, that it was about 33 m.p.h., and he said that he considers it to be about 35 with two up and luggage, so that is near enough. The ample reserve of control makes the whole process very easy.

Judgment from one example is proverbially dangerous, but the Hermes II in G-AAWY seems smoother than the Hermes I, and as the pyrometer was applied immediately before we flew it, and gave satisfactory readings on the cooling during the height of the heat wave, it ought to be a most satisfactory engine. It has newly-shaped cams, new valves and guides, new pistons and re-designed cooling fins on the cylinders.

The Spartan Arrow should be quite ideal for training and private ownership, especially where the private owner wants a safe aircraft of good wearing quality that doesn't mind being loaded very heavily and will land easily in small fields.

During a discussion on the weight of controls Mr. Simmonds said that in future the stick would be slightly longer, for extra leverage, and the ailerons would be geared up slightly more. There is now far more possible motion than is necessary.

The finish of the aeroplane is excellent.

### CINQUE PORTS ACTIVITIES.

The Cinque Ports Club are glad to welcome back Mr. D. F. Cargill, who has come down again from Broughty Ferry, Angus, Scotland, to resume instruction. He was sent solo early in the season, but had to return home.

Seven members are now waiting for a clear sky to pass their height tests.

This week the Club also welcomed Mr. Hossle as a member. He is a Swiss subject, and is responsible for keeping the Club's magnetos in order, so if he force-lands at any time through magneto trouble, all will know whom to blame!

### AN ECHO FROM STAAKEN.

When we left Staaken Aerodrome, Berlin, shortly before the end of the *Europarundflug* trials, the British camp was still rather dithering with amaze at Mr. Hubert Broad's failure to get full marks in the consumption test. The pilot himself was as much in the dark as anybody until very recently.

The high speed jet in the Gipsy II engine is opened by a cam when the throttle is pushed all the way forward. At lesser throttle openings this jet usually closes itself, but Mr. Broad recently discovered that in that particular engine it had contracted a habit of sticking open after a full-throttle take-off. On such small matters do great events depend, and no wonder the smoothness of the engine-running was almost too good to be true, as Mr. Broad remarked at the time.

### EDUCATION AT BROOKLANDS.

Arrangements are being made by the Brooklands School of Flying for a series of evening lectures on maintenance of machines, navigation, etc., to be held during the next few months. Further details will be published shortly. A new Lecture Room is being built, with heating, so that these lectures may take place in some degree of comfort during the cold weather.

There was successful night flying on Saturday, Sept. 20. Several flights were made by Mr. G. Murray and Mr. G. Lowdell. Conditions were far from ideal and a very strong wind was blowing, accompanied by heavy rain.

The School's joy-riding machines have returned from Clacton, after a very successful season.

**TRYING IT OUT.—The Spartan Arrow (Hermes II) flying at Croydon.**—(*"Aeroplane" photograph.*)

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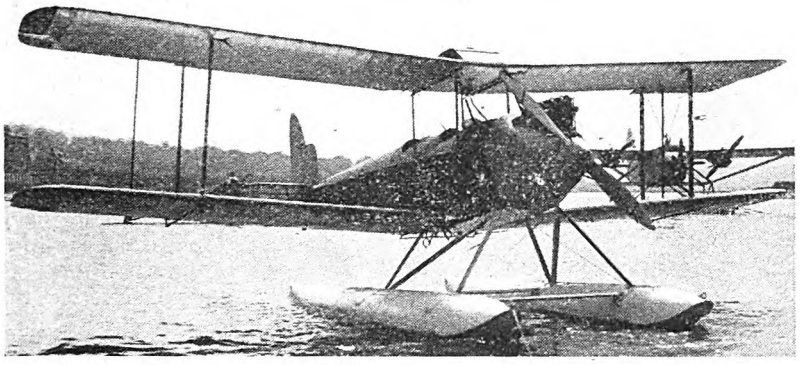

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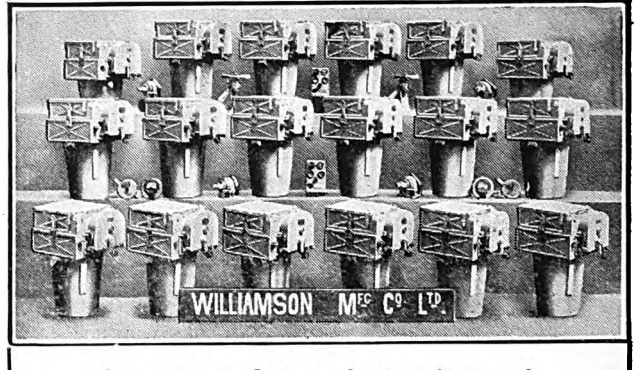


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# COMMERCIAL AERONAUTICS.

## JUNKERS AIRCRAFT FOR NEW GUINEA.

The acceptance trials of a Junkers G.31, built for Guinea Airways Ltd., and specially designed as a freight-carrier particularly adapted to the transport of exceptionally heavy and bulky articles, were satisfactorily concluded early in September. An announcement of the purchase of three machines of this type for use in New Guinea recently appeared in the German Press and this order affords such an interesting example of the importance of air transport in countries still undeveloped through lack of other means of communication, that it is as well to describe, in more detail, how the order came to be placed,—though a good deal has already been said on the subject in THE AEROPLANE.

About sixty different companies are engaged in the exploitation of the goldfields in the interior of New Guinea, the chief centre of which is the Wau. As the only other means of communication between the Wau and the nearest coast town, Salamoa, consists of tracks used by the native carrier-columns through virgin forest and over 10,000 foot mountain ranges, an air service between these two points was instituted some time ago by Guinea Airways Ltd., which now transports to the goldfields practically every kind of article that may be required there. For example, a complete hotel, made of galvanised iron, was delivered in sections by air. Also tractors and motor-lorries have been transported by the five Junkers W.34 type machines which constitute the main equipment of Guinea Airways Ltd. Two tons of mail per month and 500 kilogrammes (1,200 lbs. = 120 gallons) of beer per week are two of the items which regularly appear in the freight returns of the company.

The Bulolo Gold Dredging Company, which is one of the biggest of the above-mentioned sixty concerns, is now engaged on large-scale developments of its goldfields, for which purpose it requires two large dredgers, a hydro-electric generating plant and miscellaneous equipment, totalling 3,000 tons in weight which, as above-stated, can only be delivered to the Wau by air. The chief obstacle to the execution of this project consists in the fact that the smallest single section of the dredgers weighs 3,200 kilogrammes (roughly 7 tons).

The Bulolo Gold Dredging Company, in conjunction with Guinea Airways Ltd. have, therefore, had to find an aircraft type not only capable of flying with this load but strongly enough constructed to withstand the stresses imposed by a heavy load necessarily concentrated on a small area. Furthermore the machine had to be equipped with suitable hatches for the purpose of loading this exceptionally unwieldy cargo. The one type of machine which seemed to fulfil all these highly-specialised requirements was the Junkers G.31.

As above mentioned, the first of the batch has recently been completed. On Sept. 11 Mr. Cross, Director and Head Pilot of Guinea Airways Ltd. took off in the machine which was loaded with a piece of iron equal in weight and size to the above mentioned dredger bucket.

With this weight, three persons and enough petrol for 1½ hours flying, the machine climbed to 2,500 metres (8,000 ft.) in 11 minutes. With one wing motor stopped, it climbed from 900 metres to 1,050 metres in 2 minutes, thus improving on the performance demanded by the contract.

At the conclusion of the trial flight Mr. Cross paid tribute to the fact that, though promising much, the Junkers Company had more than achieved their promise.

Two more G.31s will be delivered to Guinea Airways Ltd. at the end of October.—H. E.

## ASSOCIATES OF THE AIR-DOGS.

The Guild of Air Pilots and Air Navigators has widened its scope by a resolution passed at a recent Special General Meeting. An amendment to the rules of membership reads as follows:

Rule 2 (a). Any person who is a British subject by birth or naturalisation shall be deemed to be eligible to be nominated and elected an Associate of the Guild who is at the date of nomination the holder of a Class "B" Aeroplane Pilot's Licence or a First or Second Class Navigator's Certificate or a 1st or 2nd or 3rd Class Airship Pilot's Certificate and who is either wholly or partly professionally engaged in Commercial Aviation.

Rule 3 (e). An Associate desiring to apply for Membership of the Guild shall produce to the Court evidence that he has the necessary qualifications defined in Rule 2.

Rule 5 (e). The annual subscription of Associate shall be Two guineas (£2 2s.) payable on election and on the 1st day of October in each year.

Rule 8 (e). The Associate shall not be entitled to exercise any vote at a general meeting or to have any voice in the conduct or management of the Guild.

The amendments seem wholly commendable in that they take under the wing of the parent Guild all recruits to the profession of commercial pilot or navigator. That is all to the good of the said professions and is far more likely to add to their prestige by bringing in all the best and consolidating them in the proper tradition.

The restriction of voting power to full members is also nothing but right and proper,—because full members are solely dependent on aviation for their livelihood and have presumably few interests which do not make for its ultimate good. Associate members need not be so wholly given up to it and their greater number might conceivably have an undue influence against the interests of the real professionals.

Except for the vote associate members will have all the privileges of attendance at meetings, lectures, functions, circularised information, legal representation, etc. Furthermore their numbers should add strength to the Guild.

## WINTER TIME-TABLES FOR AIR MAIL.

The Winter time-tables for air mails to India came into effect on Saturday, Sept. 20. The latest time of posting will now be 6 a.m. on Saturdays at the air mail box of the General Post Office, and proportionately earlier at the other boxes.

The mails are due to arrive at Alexandria on Tuesday evening; at Gaza Wednesday morning; Baghdad Wednesday evening; Basra Thursday morning; Karachi Saturday afternoon; Delhi, Sunday afternoon. This will leave a full working day for replies to be written and posted for the return journey.

On the return trip the air mail will leave Delhi on Tuesday, Karachi on Wednesday, and will arrive at Croydon on the following Wednesday afternoon.

The air mail service between Amsterdam and the Dutch East Indies, operated by the Royal Netherlands East Indies Airlines, will be available from Sept. 27 for all correspondence except parcels. Such matter posted in England for Siam, the Straits Settlements, Dutch East Indies and Malay States will leave Amsterdam on Thursdays, Oct. 25, Oct. 2 and Oct. 16. Thenceforward the trips will be made fortnightly.

The times will be about 11 days to Bangkok; Penang 14-15 days; Singapore 15-16 and Batavia 18 days. The latest time of posting will be 8.30 a.m. Wednesdays at the General Post Office and the air fee will be one shilling per ¼ oz. as far as the Malay States and 1s. 3d. per ½ oz. from there to the Netherlands East Indies.

## SPEEDING CANADIAN ATLANTIC MAILS BY AIR.

On Sept. 25 mails were delivered on board the outward-bound liner *Empress of Australia* by seaplane in the Straits of Belle Isle (Nova Scotia). If this practice is adopted as a regular service it will mean a saving of 48 hours in the time of delivery in Great Britain of mails posted in Montreal and points West.

Previously mails have been delivered by air to Father Point, Quebec, which is slightly more than 300 miles from Montreal. The Straits of Belle Isle are nearly 1,000 miles from that city.

## THE START OF THE BATAVIA SERVICE.

The regular fortnightly service from Amsterdam to Batavia was opened on Sept. 25 when Mr. van Dyk left the former city on the first trip this year. The service is run by K.L.M. (Royal Dutch Air Lines) and connects with the K.N.I.L.M. (Royal Dutch East India Air Lines).

## THE MYSTERY FLIGHT.

The Hon. Mrs. Victor Bruce is making quite reasonably good progress in her well-advertised "mystery" flight to the Far East. She left Heston on Sept. 25 in her Blackburn Bluebird (Gipsy II) and reached Munich the same day. On Friday (Sept. 26) she continued to Vienna through rough weather and decided to stay there overnight for better conditions. Fortunately she had taken an evening dress—as duly reported in the daily Press.

On Saturday she was able to go on and landed at Budapest to inquire about the weather. Then she took the air again and followed the Danube as far as Belgrade.

After a night at Belgrade Mrs. Bruce left early on Sunday morning and flew over the Balkans. She landed at Constantinople about 17.00 hours that evening, and did not leave next day. So she is well behind all records.

Throughout the flight the wireless and the dictaphone in the machine, and the advertising service in England, have worked perfectly. Also Mrs. Bruce is thoroughly capable of taking care of herself on her journey, for ap-

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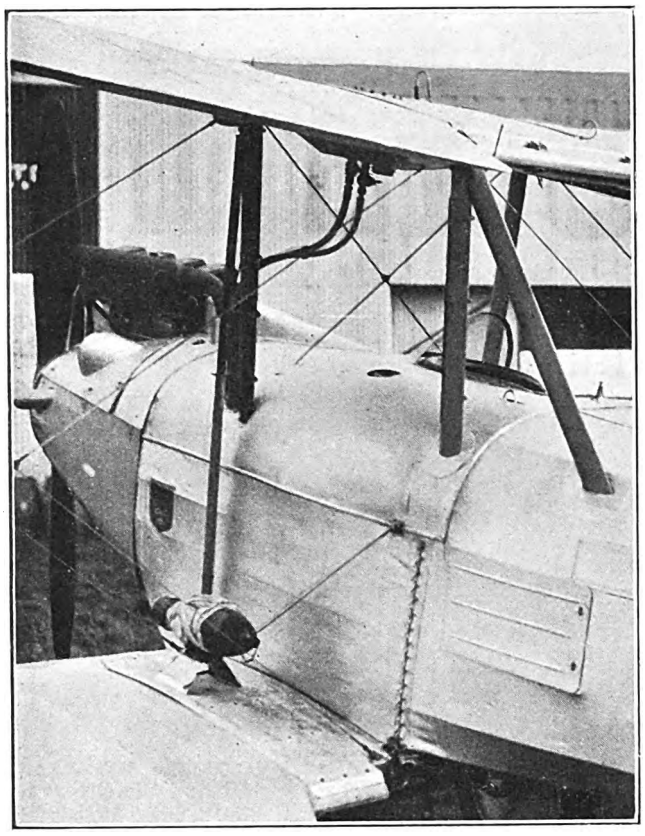
**"The Sailplane."**

**The only British paper dealing with the Sport of Gliding is "The Sailplane." Subscription, Three months, 3s. post free. Single copies 3½d. from 175, Piccadilly, London, W.1. A few copies of the third and fourth issues are still to be had, price 4½d. post free**

**"The Sailplane" can only be had by post from this office. The price has been fixed at threepence to encourage the young gliding enthusiast and such a low price will not stand Trade and Wholesale Discounts amounting to 30% or 40%. Therefore it cannot be bought from News Agents. There is practically no advertisement revenue to make up for the losses on sales. And if the Gliding Movement is what it sets up to be it will support its own paper.**

parently before doing her six hours' flying at the Brooklands School prior to taking her "A" certificate she had done four hours or more with Mr. Baker at Heston and several hours at the Blackburn aerodrome at Brough before that, so she has had plenty of air experience.

Constantinople is 1,700 miles from Heston, and Mrs. Bruce's flying time works out at 105 m.p.h. to that point. So far the mystery about the flight is what the mystery is all about.



**A WIRELESS TURN—UNACCOMPANIED.—The wireless generator on the Hon. Mrs. Victor Bruce's Bluebird (Gipsy II), also the cowling which curtails the side-by-side accommodation.**

### SCANDALOUS.

A photographic agency has sent this paper a picture of Mr. Barnard and his Puss-Moth with the legend:—"By means of ingenious windscreens no aviator's clothing becomes necessary."

We can only trust that the ingenuity consists in imparting a special ground-glass effect.

### MANY INVENTIONS.

On Friday last the Seagrave Meteor was demonstrated at Croydon Aerodrome by Flt. Lt. J. G. D. Armour. This machine is credited with a top speed of 150 m.p.h. and a cruising speed of 135 m.p.h. It seems to be the ideal machine for carrying comparatively small quantities of extremely urgent mail over long distances, especially if a relay system were adopted.

At the Imperial Airways General Meeting on Monday last the evening paper we happened to buy reported Sir Eric Geddes as complaining that the G.P.O. Air Mail policy was wrong and that "Empire service was being retarded."

On another page of the same paper the Air Correspondent was advocating high speed air mail between England and Australia with some such machine (to start with) as the Puss-Moth, which cruises somewhere around 110 m.p.h., and this it was suggested could be done with six machines in relays, reducing the England-to-Australia flying time to six days. This is thought to have been quite a spontaneous article, and not at all inspired by the G.P.O. as an answer to Sir Eric.

The Seagrave Meteor is shortly to be flown to Rome, it is said, for a special demonstration by Flt. Lt. Armour before General Balbo, the Italian Air Minister. It is hoped that Signor D'Annunzio will again descend (as he did in Miss Spooner's case) from the eagle's eyrie on the mountains, where he is said to dwell uncomfortably, but poetically, with some apt quotation from the English poets, such as—

Twinkle, twinkle, little star,
How I wonder what you are,
Flying in the skies so far,
Come and have one at the bar.

We understand that Miss Spooner, who knows what is what in the way of an aircraft as well as any, and better than most, has ordered a Desoutter monoplane for her private use. An order of this sort from such an expert is a distinct feather in the ancestral Homburg of Mr. Desoutter.

There are lots of changes in commercial aviation circles. Mr. Paul Grosfils, who has been London Manager for Air Union for years, having given up his position with that Firm in order, it is said, to devote himself to International Aviation.

Mr. Keir-Smith, who has represented Messrs. Napier and Sons at Croydon for a considerable time, is leaving the Aerodrome to the sorrow of his numerous friends, and may, it is believed, be going abroad for his Firm.

Air Union are losing two very able pilots, also, in Messrs. Delage and Sautereau, both well known at Croydon. They are going to South America, where it is understood they will fly for the Aéropostale Company.

Although we ourselves were in the vicinity of Newquay when the recent Plymouth Festivities were going on, we suspected that some of the lads from Croydon must be there, for the wind blowing from that direction brought faint noises to our ears similar to the chirruping of a cheerful chiropodist chuckling through his chest protector. It was the lads enjoying themselves, bless their hearts.

Incidentally, we met a stranded seal on the sea-shore looking remarkably out of his element and very like a commercial pilot with no flying to do. The seal looked at us with the same wistful but by no means unintelligent eyes as you may see in the pilot's room any day, and made queer moaning noises, exactly like a stand-by pilot. Also, he seemed at a loss to know what to do with his spare time, and shuffled about the shore in an uneasy manner, the nearest pub being about two miles away across country.

At Plymouth Mr. Bernard Wilson was demonstrating a Hermes Avian to a large collection of schoolchildren assembled on the Hoe. Having got the little dears thoroughly interested with their necks craned and their eyes and mouths wide open with astonishment at his aerobatics, he somewhat basely designed to drop about half a ton of confetti on them. However, the bag would not open, and he had to fly out to sea and drop it in the form of a bomb.—[Which was equally illegal, if inside the three-mile limit. And had he Air Ministry permission to drop confetti?—Ed.]

It is said that certain Plymouth piscicultural professors have been puzzled by pilchards which have come ashore covered with pink, blue and white spots.

It seems that H.M. Customs and Excise at Croydon Aerodrome have a large silver goblet which was presented years ago by Messrs. D. Napier and Sons to be played for six a side at soccer, and about six years ago H.M. Customs won it from the Air Ministry Traffic Staff. Since then it has not been played for at all, and H.M. Customs now throw out a challenge to all and sundry to play them for it.

Teams must belong to individual Firms, or Departments connected with Commercial Aviation, or, in the case of big Firms like Imperial Airways, of departments such as "Traffic," "Engineering," and so forth.

We have all grown about ten years older since the cup was presented, and it might be better to re-award it for some sport more suitable to our years and our average athletic standard, such as golf (real, clock, or miniature), bowls, halma, spillikens, shove-ha'penny, knurr and spell, crown-and-anchor, or something of that sort. We may not have many really hot football players amongst us, but there are surely a few who can wield a subtle spilliken or flip a masterly tiddledy-wink.

Let not the stranger scorn our local athletes, for we know of at least one among us who can play Rule Britannia on a row of pint pots with a cigarette-holder, provided somebody else will fill them all with different quantities of good bitter beer.—SPRY.

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# TRADE NEWS

### TRADE OPPORTUNITIES.

The following letter indicates some fine business opportunities for firms here and overseas who are ready to seize a good thing. The Desoutter is quickly becoming one of the most admired of British aeroplanes, and the agency should be well worth having. The Desoutter Co., whose address is Croydon Aerodrome, London, S.W., write:—

Sir,—We should like to advise you that the exclusive agency for the British Isles which this company had granted to National Flying Services for Desoutter aircraft has now been terminated, and that this company is now in a position to consider applications for agencies and representations in the British Isles as well as in the overseas Dominions and in foreign countries.

(Signed) Desoutter Aircraft Company Limited,
A. M. Desoutter.

[Readers should note that next week's issue of The Aeroplane will include a Special Supplement devoted to Desoutter Monoplanes.—Ed.]

### REGULAR NIGHT FLYING AT HESTON.

The recent experimental night-flying week at Heston has occasioned such a demand for facilities that night flying at stated intervals will probably be on next Spring's programme at that aerodrome.

The applications for instructional and practice flights were numerous, and several private owners are anxious to have their machines wired for night operation provided they can use at least one aerodrome at known times. For this reason Airwork Ltd. may add permanent lighting to their equipment, and thus become the first privately-owned landing-field in England to be so furnished.

Some of the enthusiasm for nocturnal aviation seems to have been due to the spectacular attraction of the lights of London. Some pilots flew from considerable distances to have the opportunity of flying from the lighted Heston Aerodrome and seeing London from the air by night.

If the present plans go into effect Heston will become the Mecca of all aviators who incline to be out a bit late,—and not all of them will be content to get in early indefinitely. When aerodromes receive a fraction of the attention that roads do there will be lighted landing-fields often enough to make night travel in ordinarily good weather no more dangerous than daylight flying, and considerably less dangerous than night-driving on black roads against badly focussed headlights.

### ACCESSORIES TO THE FACT.

The following letter indicates, in the courteous way for which the people at Heston are so notable, the appreciation of Airwork Ltd. for the help given by various firms.

Sir,—In view of the favourable and enthusiastic way in which the aeronautical Press has commented on our recent experiment in night-flying tuition, we should be ungrateful were we not to request you to permit us publicly through your columns to pay our tribute to the manufacturers of those night-flying accessories with which our machines and aerodrome were equipped.

It is already well known that the flood lighting was arranged by Chance Bros. and Co. Ltd., the lighthouse manufacturers, of Birmingham. The obstruction lights on the buildings and wireless masts, as also the lighting of the tarmac in front of the Club House, were carried out by Messrs. C. A. Ramsey and Sons, 42, Richmond Road, Staines.

The navigation lights were Vickers-Davis, lit by cells supplied by the Chloride Electrical Storage Co., Ltd. Special propellers, black matt painted on the backs to prevent reflection of light, were the work of The Airscrew Company Ltd., of Weybridge. Protection in the event of a forced landing outside the aerodrome was supplied by The Yorkshire Steel Co. Ltd., in the shape of Holt Brackets and Flares.

Each and all of these items of equipment gave unfailingly excellent service through the experiment.

(Signed) Airwork Limited.

[If everybody in business were as quick to acknowledge services rendered as are (or is) Airwork Ltd., the wheels of Commerce would run more smoothly and we should hear less about bad trade. Politeness costs nothing and pays big dividends.—C. G. G.]

### EDUCATING THE PUBLIC.

Mention has been already made in The Aeroplane of the double service which is being given by the Aviation Department of Selfridges in Oxford Street. In this department people who fly can buy anything they want, from a complete aeroplane to such an accessory as a Pratts' one-gallon pump for filling machines at their own private lock-up. This side of the work of the department goes steadily forward and day by day more maps, more books, more flying equipment and more instruments are sold.

This is of real value and is slowly increasing the market for the products of the Aircraft Industry. All these people are becoming used to aero-engines and such paraphernalia. They are coming to accept them, as they accept everything else in the building, as part of their work-a-day life. People will begin to express less and less distaste when the youthful members of the family learn to fly. They will go by air when they travel as the quickest and safest way.

Recently at Brooklands and Heston there have been demonstrations of night-flying by, and for, the private owner. The necessity for this seems queer. Nobody had to be shown that a car could be driven at night, one merely did it,—and cursed the inefficient lighting devices of the early days. But there is a need to show people how they can fly at night and Airwork Ltd. together with the Brooklands School of Flying must be commended for showing how it is done.

On the whole the general public is not affected by these demonstrations, mainly because the persons who are the medium through which the results of such demonstrations are passed on, do not appreciate the value of what they are seeing. After the demonstration one reads next day that daring loops and evolutions were performed over an illuminated field by dare-devil pilots.

The journalist has to get a "story" or describe what he has seen as "thrilling." There is no space in the papers for matter which shall lead the man-in-the-street up to a better appreciation of how all the time the Aircraft Industry is perfecting devices to make flying safe and serviceable. The good work which the journalist might do has to be done differently. There are exceptions, of course, and their names are known to all who are interested in Aviation, but the ordinary newspaper reader does not hear about such shows from the right angle.

This is where the Aviation Department of Selfridges is doing so much good. Until lately they had a kind of modified wind-tunnel in which a model aeroplane could be manœuvred by the manipulation of a normal control-stick and rudder-bar. This mechanism must have given an enormous number of people a clear insight into the way in which an aeroplane is controlled.

Now they are doing what they can to explain how one can fly at night. As you approach the Aviation Department a powerful light begins to light up everything that comes within the spread of its own widely diffused but flat beam. When the light has been traced to its source you see one of the floodlights. This has been used in the night-flying experiments to which reference has been made above. The million candle-power bulb is not inside. This enormous globe is on show where people can see the large dimensions of the filaments.

The beacon itself has a one kilowatt ceiling light in it and although this has but some minute fraction of the power of the proper bulb a remarkably powerful beam is spread across the floor of the other departments in the vicinity of the Aviation Department.

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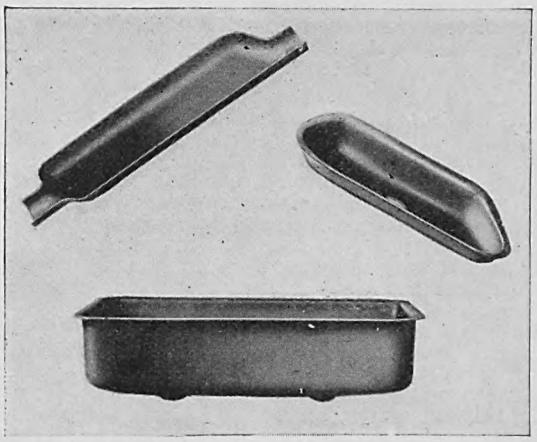

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The light attracts much attention and all day long there are groups of people looking at the beacon and then reading the explanation of its use,—which is prominently displayed nearby.

### PRETTILY DONE.

Imperial Airways Ltd. have issued a well got-up leaflet telling the world about their tea-flights over London. People who already realise the practical advantages as well as the potentialities of aviation should make a point of seeing that their friends get a copy of this leaflet and then that they take tea in the Argosy.

These trips are made every Friday, Saturday and Sunday afternoon. Cars take one from Airways House, Charles Street, to Croydon, and bring one back. The car leaves at 14.30 hrs. and returns about two hours later. The inclusive fare is two guineas.

### A DIFFICULT CUSTOMER.

The other day an elderly man who had recently got his "A" licence went to the Showrooms of the best-known firm who supply instruments for aircraft, and said he wanted a compass. He was shown every compass in the place but found something wrong with all of them. Finally he said that he thought that it did not really matter as he had a pocket-compass and he only wanted to know North from South.

The humorous aspect of this is the most obvious, but those responsible for training the gentleman in question must have been casual in their instruction if an "A" licence pupil of theirs could have been allowed to pass his tests with so little appreciation of the niceties of aerial navigation.

### A DICTAPHONE FOR MRS. BRUCE.

Fitting a Dictaphone to an aeroplane seems a somewhat florid gesture. But reflection alters this opinion, and shows there is something to be said for the scheme. Pilots, particularly service, and air-line pilots, are always having to make notes. This means that they have to scribble on a pad which they have to pull from somewhere, and they have to grasp in a heavily gauntleted hand a pencil which has been dragged from somewhere else. How much simpler their job would be if all they wanted to say could be taken down on a cylinder from which a legible transcription could be made.

Mrs. Victor Bruce has had a Dictaphone put in her Blackburn Bluebird in which she is now travelling, as widely advertised, to an uncertain destination. This instrument has been installed by Mr. William Dixon who as long ago as 1912 was making experiments at Upavon to see whether Dictaphones could be used in the air.

The Dictaphone which has been put in Mrs. Bruce's machine only weighs twelve pounds and is carefully sprung to insulate it from vibration.

### IN THE FOREFRONT OF THE MODE.

Until cabin machines become the rule, rather than the exception which they will probably remain for some time to come, special provision for clothing is necessary in any but the warmest weather. Even then most pilots prefer to be so dressed that their ordinary clothes get some protection during work on the aeroplane and engine.

The Sidcot type suit and drill overall have the disadvantage that they must be worn all at once or not at all and they are not easily donned and doffed unless they fit like sacks.

The latest solution to these practical troubles, and also one of the smartest *ensembles* yet seen in this line, is the Kestral aviation suit offered by D. Lewis Ltd., of 124, Great Portland Street.

The original design, for which patents are pending, was made up in soft leather, fleece-lined. All up the front zipper fasteners give quick and easy means of getting in or out, but the most interesting feature is a similar open-ended zipper all round the waist which allows the suit to be used in whole or in part, to be put on separately or together, and to give the advantages of separate garments as well as that of a combined suit without flaps, buttons, buckles or uncertain connections.

Zippers at the ankles, press-buttons there and at the wrists and a strapped collar make a really useful leather suit for the hardest work. There are two breast pockets with zippers and thigh pockets above each knee with press-buttoned flaps.

In the women's style the same colours are available and the same general design is adhered to, but the collar, ankles and wrists have really woollen turnovers. The zipper fastenings throughout, all rust-proof and open-ended, allow a really well-fitting garment to be made as easy to get into as a jacket and slacks but perfectly and permanently windproof.

Besides being windproof the leather is both washable and showerproof, very soft and light in weight.

For those pilots who do not require quite so smart and durable a garment, the same design will shortly be obtainable in gabardine lined with fleece and oilskin. These will be somewhat cheaper than the leather suits, which are priced at thirteen guineas.—F. D. B.

### AS WAS TO BE EXPECTED.

The first four machines in the race for the Grosvenor Cup all had Cirrus Engines. All these engines, as one has learned to expect, had K.L.G. sparking plugs. The ubiquitous successes of these plugs seems likely to make K.L.G. and "sparking-plug" synonymous.

### MAPPING EXTRAORDINARY.

One of the most interesting, useful and amusing advertisement efforts of recent date is the plan of the New Forest issued by the Anglo-American Oil Co., from 36, Queen Anne's Gate, Westminster, S.W.1. Frankly it is an advertisement for Pratt's petrol and Pratt's motor oil, but to the motor tourist and even to the aviator the plan is quite entertaining. The whole thing is on the lines of one of those ancient maps in which the names of places are accompanied by illustrations of the flora and fauna of the vicinity. Those who would like to have a copy are advised to write and ask for it and mention The Aeroplane.

### NEW COMPANY.

Brant Aircraft Ltd.—Private company. Registered Sept. 22. Capital, £1,000 in £1 shares. Objects: To acquire the business of aircraft designers and constructors now carried on by A. A. Sidney, F. W. J. Grant and L. E. Baynes, and to carry on the business of aviators, carriers and transporters of passengers and cargo by flying machines, aeroplanes, airships, balloons, etc. The directors are: A. A. Sidney (chairman), 36, Chipstead Avenue, Thornton Heath, Surrey (director Sidarblen Engines Ltd.). F. W. J. Grant, 10, Purley Park Road, Purley, Surrey (partner in Surrey Flying Service, and director of Aviation Tours Ltd.). L. E. Baynes, 552, Purley Way, Waddon, Surrey. Secretary: F. W. J. Grant. Solicitors: Peard and Son, Union Bank Chambers, Katharine Street, Croydon. Registered office: Waddon Aircraft Factory, Stafford Road, Wallington, Surrey.

### SATISFACTION.

English Instrument and Gauge Company Ltd.—Satisfaction in full on Aug. 19, 1930, of first debentures authorised Jan. 29, 1929, and registered Feb. 6, 1929, securing £8,792.

## PERSONAL NOTICES.

Death.

SANT.—On Sept. 25, at Rotherham General Hospital, as the result of a flying accident on Sept. 23, Alfred Cecil Sant, Plt. Off., R.A.F., the youngest son of the late the Rev. Edward Sant, formerly Vicar of Elsenham, Essex.

Mr. Sant joined the R.A.F. with a short-service commission in January, 1930, and was posted to No. 2 Flying Training School, Digby, for a course of flying training.

Forthcoming Marriage.

ALLEN—RILEY.—The engagement is announced between Flt. Lt. William Shepherd Allen, R.A.F., son of William Allen, K.C., of Woodhead, Cheadle, Staffordshire, and 16, Park Square, N.W., and Joan Noel, daughter of the late Oliver Riley and Mrs. William Allen.

Births.

ADDAMS.—On Sept. 21, at Brackenbury House, Felixstowe, to Nettie, wife of Flt. Lt. James Addams—a daughter.

LELEU.—On Sept. 12, at Streatham Manor Nursing Home, to Constance Evelyn, wife of Lionel L. Leleu, R.A.F.O.—a daughter.

METCALFE.—On Sept. 24, at 19, Bentinck Street, W.1, to Inez (*née* White), wife of Flt. Lt. R. F. C. Metcalfe (retired), of 58A, Lexham Gardens, W.8—a son.

OXLAND.—On Sept. 23, at a nursing home, Farnborough, to Ethel Barbara, wife of Wing Cdr. R. D. Oxland, R.A.F.—a daughter.

SCRIVEN.—On Sept. 28, at Melbourne, to Hilda Jean (*née* Grice), wife of Sq. Ldr. V. R. Scriven, A.F.C.—a son.

SEATON.—On Sept. 20, at "Boscombe," Botley, Hampshire, to Elsie, the wife of Flt. Lt. R. A. Seaton, R.A.F.O.—a daughter.

Fit "TripleX" Regd -and be safe!
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# MISCELLANEOUS ADVERTISEMENTS.

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## AIR SURVEY.

**Air Survey Co. Ltd.**, 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.

**The Aircraft Operating Co. Ltd.**, 8, New Square, Lincoln's Inn, London (Holborn 8131), and Broken Hill, Northern Rhodesia; Rio de Janeiro, South America; Contractors to the Ordnance Survey, Drawing Offices and Laboratories, Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

## AIRCRAFT INSTRUMENTS.

Aero basket seats 2s. 6d.; C.A.V. Hand Magnetos complete 15s.; Avro pattern safety belts 2s.; Screw Pickets 12 in. 6d.; K.L.G. Plugs F.7. 1s. 6d.; F.9. 9d.; F.12. and 15. 1s.; Hand Pressure Pumps with release cock 1s. 6d.; Cirrus Mk. I Engine complete £30. Coley distant reading Thermometers 25s.; Pressure Gauges, Airspeeds, Aneroids, Levels, etc. Send for list. Why not visit this interesting store of Aircraft supplies! Coley Ltd., Ordnance Works, Kingston-on-Thames. 8-6, including Saturdays.

## AIRCRAFT FOR SALE.

### D.W. SCHOOL OF FLYING LTD.

For Aircraft, Sales and Service. Ford Aerodrome, Yapton, Sussex. Littlehampton 419.

**Blackburn "Bluebird" side-by-side seating**, all-metal construction. Price £595. Sole world distributors. Auto-Auctions Limited, Burlington Gardens, Old Bond Street, London. Aerodrome: Heston.

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**Henlys for Avians.** Come to Heston and inspect the latest Avians. Prices from £575. We have a few first-class second-hand machines available at very moderate prices. Henlys, Heston Aerodrome, Middlesex. 'Phone, Hayes 410.

**Phillips and Powis Aircraft (Reading) Ltd.** have a number of used aircraft in excellent condition to offer. The following are three examples—

Puss Moth—40 hours, new condition throughout, £750.

Metal Moth—120 hours, compass, watch, new condition, £510.

X-type Cirrus Mark 2 Moth, slots, compass, excellent condition, £385.

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**Immediate cash for modern aircraft**, crashes or engine. J. H. Bartlett, 58, Warren Street, W.1. Museum 7915.

**Moths, with or without C. or A., or damaged.** Also other types and engines. Box No. 5897, The Aeroplane, Cannon House, Pilgrim Street, E.C.4.

## AIR TAXIS.

**Air Taxis Ltd.**, Stag Lane Aerodrome, Edgware. 'Phone: Edgware 0849.

**Aerofilms Limited**, Aerial Tours, Taxi Work, Aerial Photography. Air Survey. Colindale Avenue, Hendon, N.W.9. 'Phone: Colindale 6183 and 6184.

## ENGINES FOR SALE.

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## PRACTICAL FLYING.

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**For Your Information.**—If you want to know all about private flying buy a copy of **The Broad Skyway** from The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C. 2s. 6d., postage 2d.

**Learn to Fly at the Midland Aero Club.** Four tuition machines, two fully qualified expert instructors. No waiting. Particulars, Hon. Secretary, 22, Villa Road, Handsworth, Birmingham.

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### PATENTS.

**A. Peter Thurston and Co., Patent Agents, Aeronautical Consulting Engineers, 329, High Holborn, W.C.1. Telephone Holborn 2542.**

**Patents and Designs Acts, 1907 to 1928.** It is hereby notified that the owners of British Patents No. 165086, for "improvements in or relating to Means for Controlling the Carburetters of Internal Combustion Engines" are prepared to enter into negotiations with interested parties for the sale of the Patent and other British Patents relating to Carburetters, etc. Communications please address to Messrs. Dicker, Pollak and Mercer, Chartered Patent Agents, 20-23, Holborn, London, E.C.1.

### REPAIRS AND OVERHAULS.

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### EMPLOYMENT.

**Merriam's Aviation Bureau.**

Capt. Warren Merriam invites all who seek Advice, Employees, or Employment, to write to Whiteley Bank, nr. Wroxall, I.O.W., pending reorganisation of London headquarters.

### SITUATIONS VACANT.

**Junior Assistant Draughtsman** wanted, capable of carrying out detail drawings and simple stressing. Workshop experience an asset. Write Southern Aircraft Ltd., Shoreham Aerodrome, stating experience and salary required.

### SITUATIONS WANTED.

**Aircraft Fitter**, energetic, willing to take responsibility, 13 years' aircraft experience, bench and erecting, desires position of greater scope. Apply Box No. 5932, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

**Young Man**, 19, healthy, good physique and education, desires position to train as pilot and navigator, etc.; is an excellent motor-coach driver and has confidence of ability to become an excellent pilot; has small capital available. Box No. 5933, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

**Young Man age 26 seeks position** Aircraft firm or elsewhere. 10 years' aero engines; good character; anything, anywhere. Box No. 5926, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

**Young Man**, 27, seeks position Aircraft Industry, Publicity side preferred. 12 years' close study aviation, excellent knowledge types, design and construction, competent artist draughtsman. 11 years' business experience. Utterly keen. Box No. 5934, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

**Young Man**, single, aged 28, urgently requires situation as handy-man, etc., 8 years' R.A.F. aero-engine fitter, L-AC, knowledge of ground work and aircraft maintenance, cars, etc., willing to try anything, anywhere.—5, Jenner Street, Burmantofts, Leeds.

**Young R.A.F. Officer** desires post aircraft firm, any capacity, home or abroad. Salesman for preference. Box No. 5935, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

**Practical Engineer**, 31, wants position with prospects, preferably with a small aero-engine or aeroplane manufacturer. Experienced designer, also jigs-tools, estimates. Tool-room, manufacturing and Experimental Shop experience and not afraid to start there again. Tact and initiative, can organise, will accept a reasonable salary but prospects essential. Box No. 5929, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

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### MISCELLANEOUS.

**Avro 504K Spares.** New main planes; Cowlings; **Undercarriages; Skids; Tanks, etc. Send for separate list. Coley Ltd., Queen Elizabeth Road, Kingston-on-Thames. Phone 0365.**

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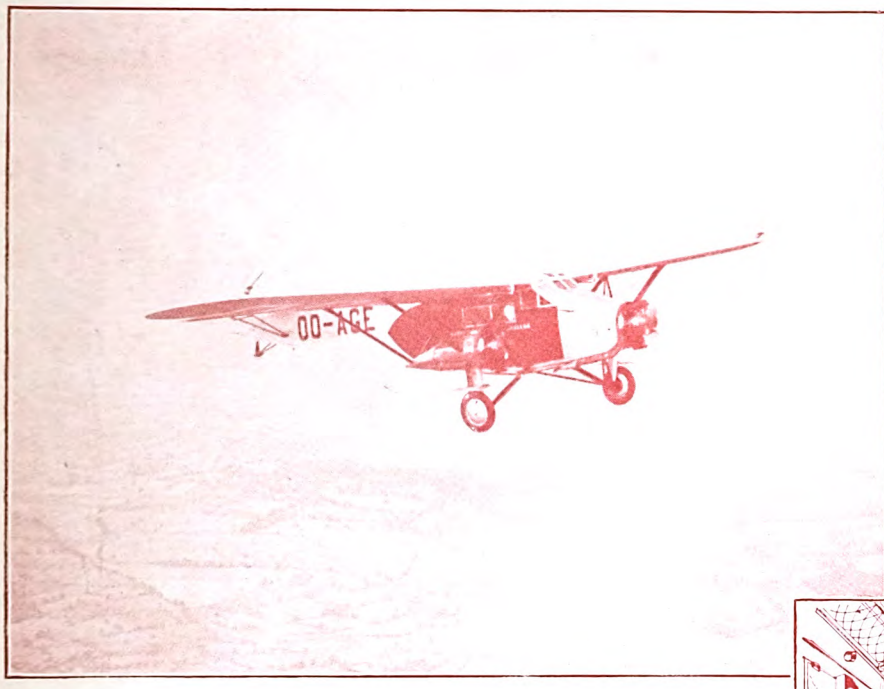


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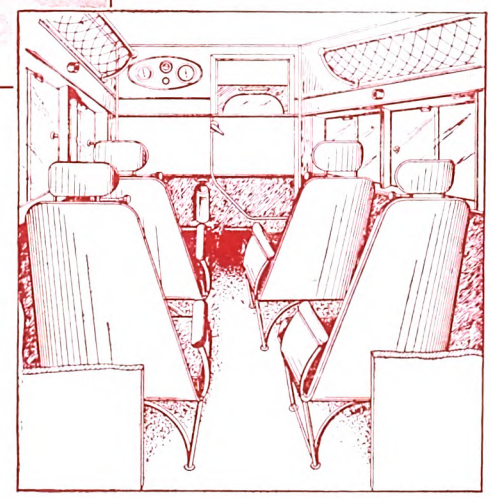

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The Wessex maintains a cruising speed of 95 m.p.h. for 5½ hours, with a pay load as a Passenger Machine of 1,100 lbs. or as a Goods Machine 1,200 lbs., and can maintain at least 4,000 ft. on two engines only. Total fuel consumption of all three engines is 18½ gallons per hour.

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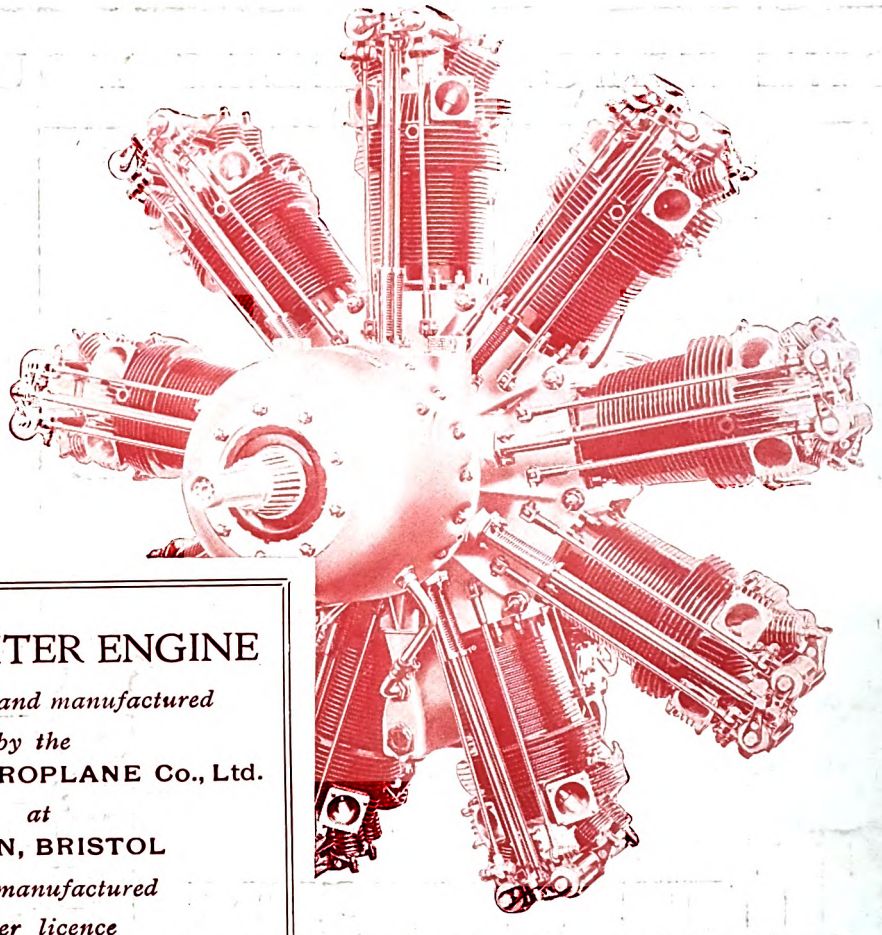

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Oct. 8, 1930.] Registered at the G.P.O. as a Newspaper. [Vol. XXXIX. No. 15

# THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

THE "HERMES-DESOUTTER"

THE FIRST CABIN AEROPLANE TO ACCOMPLISH SUCCESSFULLY THE ENGLAND-AUSTRALIA FLIGHT CARRYING A CREW OF TWO. FEB. 1930.

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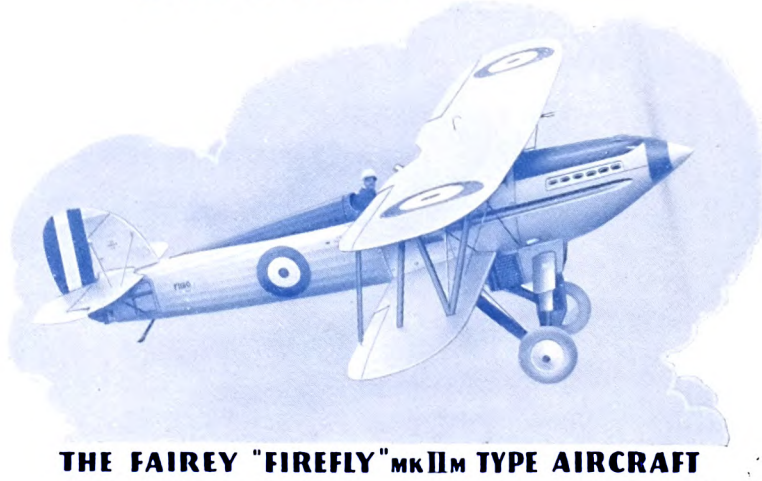

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# FAIREY

HIGH PERFORMANCE SERVICE AIRCRAFT


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OCT. 8, 1930.

# THE AEROPLANE

Incorporating

Aeronautical Engineering

VOL. XXXIX

No. 15.

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Accounts relating to Publishing and Advertising should be sent to the Offices of Aeronautics Ltd., Cannon House, Pilgrim Street, Ludgate Circus, E.C.4. Telephone: Central 5822.
Subscription Rates, post free: Home 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s. Abroad, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8. U.S.A., 1 Year, $8.50. Entered as second class matter at the New York (N.Y.) Post Office.

## THE R.101.

All undertakings which are in the end for the welfare of humanity claim their toll of martyrs to the faith. New religions, new scientific developments, new mechanical devices all cost lives which seem, to our merely human intelligences, to be cut off at the time when they seem to promise the greatest usefulness.

Those who died in the *R.*101 rank with those British and American officers and men who died in *R.*38, and with those Americans who died in the *Shenandoah* and the *Roma*, and the French who died in the *Dixmude*, and the Germans who died in the *L.II*, as martyrs to the development of airships. And we owe as a duty to those martyrs that their work shall go on.

The deaths of those who died at the stake or on the cross or by the sword for their religions did not restrain others from carrying on their work. Those who have died slowly and painfully, and those who are still dying, of X-ray dermatitis have not hampered the development of radiology, which has already done so much for suffering humanity.

The burning of *The Amazon* at sea in 1860 or thereabouts did not delay the development of ocean-going steamships. The capsizing of *The Captain* somewhere in the 1870's did not hinder the Admiralty's work on steel warships. The sinking of *The Titanic* did not prevent the production of the gigantic liners of to-day. All these disasters merely spurred to greater efforts those who were concerned with such developments. And in like manner our Air Ministry should be spurred by the fate of *R.*101 to build better airships.

### Causes, Direct and Indirect.

The cause of the accident cannot be known. The tales of the survivors can be of little use. We read of the ship seeming to pitch forward, or dip her nose. That would naturally be the sensation of those on board if she rammed her nose into the trees on the Beauvais Ridge.

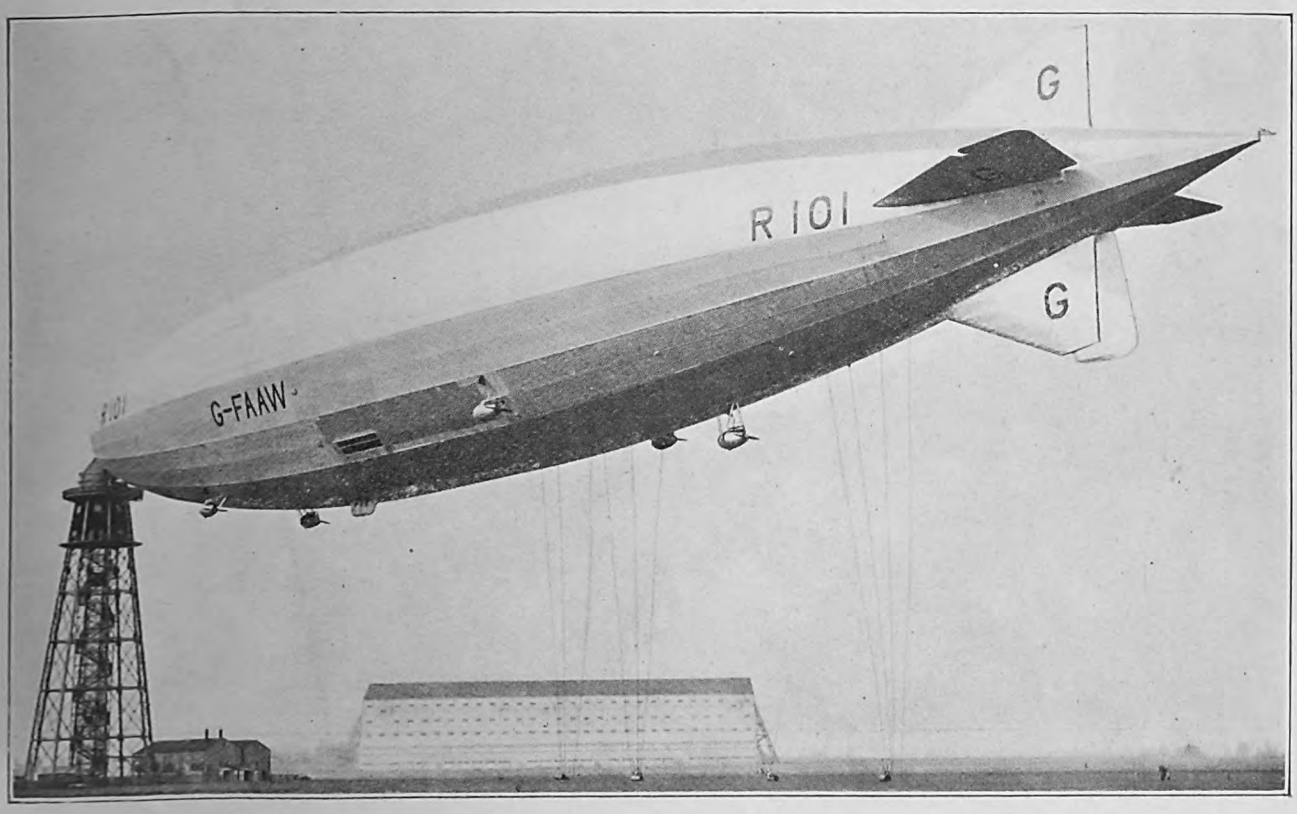
The theory that she was weighed down by the heavy rain seems weak when we consider that shortly before the accident the ship had reported to Croydon (as shown hereafter) that she was already regaining the water-ballast which she had let out at the start. If she was purposely taking in rain as ballast that is proof positive that she had ballast to spare and could have been higher if the officer who was in command at the time had so wished.

The only question that seems to need answering is why was the ship low down over Beauvais with the fatal Ridge a few miles ahead?

Every aeroplane pilot who has ever flown to Paris knows the Beauvais Ridge. In the earliest days of Civil Aviation the Ridge was littered with the wrecks of aeroplanes which had tried to get through under low clouds and had been trapped between the Ridge and the clouds. Later on, when instruments and radio telephony improved, pilots took to going up over the clouds while crossing the Ridge and came down through the clouds on the other side if they knew that there was clear air below.

With such a gale as was blowing on Saturday night every hill on the Ridge would have a terrific down-draught on the leeward side, like the curl-over of a breaker at sea. And any floating mass, such as an airship, which might be

"YET I ARGUE NOT
"AGAINST HEAVEN'S HAND OR WILL, NOR BATE A JOT
"OF HEART OR HOPE: BUT STILL BEAR UP AND STEER
"RIGHT ONWARD."—(Milton—*Sonnet.*)

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within a few hundreds of feet of the top of such a hill would almost certainly be caught in that curl-over and forced to the ground.

The published photographs show fairly clearly that the nose of the ship went into the trees near the top of a hill, which looks as if she drove in head-on. But conceivably she may have been planted almost flat by the down-draught.

In either event she went in with her engines running, which would account for the hydrogen from the burst gas-bags catching fire. Or alternatively the crumpling of the front of the ship and the breaking of electric-light wires or switches, with sparks resulting at the same time as the bursting of the forward gas-bags, would be enough to account for the fire.

Whatever may have been the immediate cause of the fire, the prime cause of the disaster was that the ship was where she ought not to have been,—namely below 2,000 feet over a ridge which is between 600 feet and 1,000 feet high.

### Further Information.

On the afternoon of Monday, Oct. 6 the daily papers published a statement alleged to have been made by Air Commodore F. V. Holt, C.M.G., D.S.O., Director of Technical Development, which reads as follows:—

> The definite cause of the accident was breakage of the structure and not motor failure.
>
> We have found parts which fell as far as five miles from the scene of the wreck, indicating that something happened at least five to ten minutes before the crash.
>
> These parts have been gathered and will be studied. I cannot say anything further until the inquiry has been closed and experts' report handed to the Air Ministry.

Air Commodore Holt denies flatly that he made such a statement. But the facts may be as stated.

This puts a different complexion on the matter, but not so much so as might be thought. Though parts may have been falling off the airship evidently those at the controls did not know it. Two of the very first people who would know if anything were going wrong would be the wireless operator and the helmsman. And in none of the various interviews with Leech, the engineer who is said to have been at the controls, or with Disley, the wireless operator, is there any indication of their having had any warning of trouble.

Furthermore one of the very first acts of the Commanding Officer in case of trouble of this kind would be to stop his engines, and two of the surviving men were engineers, one of whom was just relieving the other in one of the engine cars. They also had no warning.

Also, if anything had seemed to be wrong the sleeping passengers and the watch off duty would at once have been warned.

As no warning of any kind seems to have been given, obviously the officer in command at the moment of the accident did not know that anything had been wrong for those previous five miles,—which with such a slow ship must have meant something over five minutes. Therefore the low level at which the ship was flying is still unexplained.

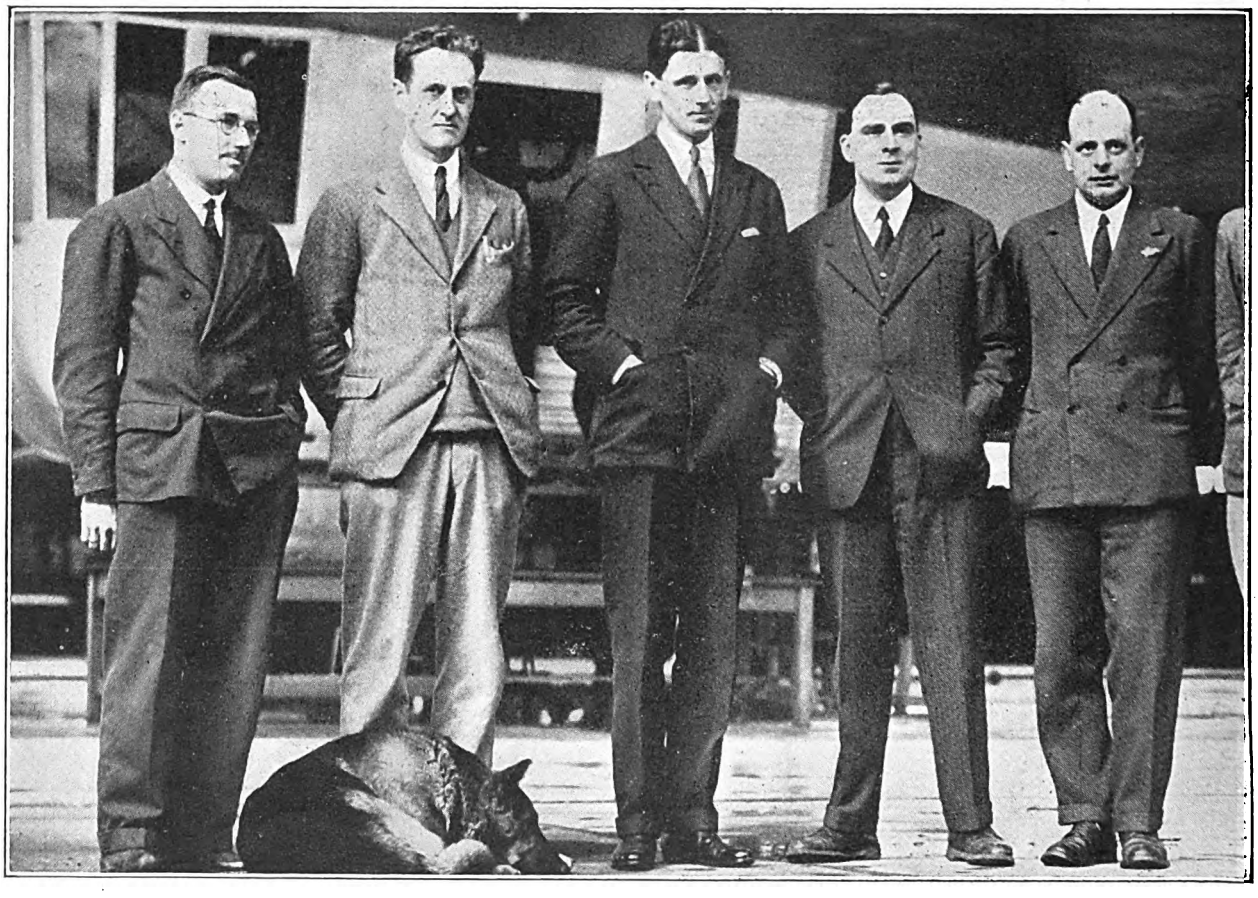
### Death Traps.

In an accident of such a kind, in fact in an accident of any kind, such as a descent on the sea, a ship of the type of the *R*.101, or the *R*.100, would simply be a death-trap. All the cabins and living space are inside the fabric envelope. The beautiful promenades which have been so plentifully illustrated are enclosed by heavy celluloid panels through which a man could only make his way with an axe or a hammer. Some of the survivors seem to have been saved because the shock of the landing carried away a water-tank which burst a way through the fabric for them.

When I went over each of these ships before it was launched I remarked on the awful shut-in feeling, and asked how one got out in case of accident. The answer in each instance was that there would be no accident which would make an instant exit necessary, and that the passengers would have to put up with the shut-in feeling for the sake of the efficiency gained by not having a cabin sticking out underneath.

But after the *Graf Zeppelin* had been to Cardington, and several notabilities had travelled in that ship and had remarked on the comfort of having cabin windows which opened, and on the free feeling it gave, the official opinion seems to have changed. Only a week or two ago one or other of the experts who write on airships mentioned that an external cabin would be used in future ships, or might be fitted to *R*.100 as modified.

Possibly such a cabin might not have saved lives in such an accident as destroyed *R*.101 for if she were planted flat by a downward gust the girder-work above might collapse on top of the cabin and spread over either side of it and trap the inmates. But in a head-on collision, such as this may have been, there might have been time to get out before the flames reached the cabin. Those who have seen a kite-balloon burn at Hendon will remember that the flames take some seconds to take hold, and burn fiercely upward, so that quick movement and a clear exit below would give a man a chance. Many a man of the kite-



**SOME OF THE OFFICERS.—Left to right: Flg. Off. Steff, R.A.F., Lieut.-Cdr. N. G. Atherstone, A.F.C., Flt. Lt. H. C. Irwin, Lt.-Col. V. C. Richmond (Chief Designer), and Major G. H. Scott.**

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"It is noteworthy to record that in the case of the S.1150 the completion of this cruise brought her total flying time since purchase to 596 hours, and she had been afloat for one year and 75 days. During that time also she had experienced no trouble of any kind. With the exception of one or two minor technical troubles, such as the changing of one plug, the aircraft and engines behaved splendidly throughout the whole period of the cruise."

*The Royal Air Force Quarterly*
*July*, 1930.

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balloon sections during the War 1914-18 owes his life to these facts—and a parachute—after his balloon was set alight by enemy aircraft.

### Our Duty to the Dead.

As has been suggested at the beginning of this article, the best monument we can set up to those who have died is a fleet of airships which shall fulfil Lord Thomson's ambition to link up the Empire by airship. A dozen airships bigger and better than R.100 or R.101 could be built for the price of a single Cunarder for which contracts are now being placed. They could be operated for less subsidy than the Cunarder will draw from the British Taxpayer, and they would do far more to bring the units of the British Empire together than will ever be done by transporting American millionaires in a luxury steamship.

This is a matter with which the Imperial Conference may fitly deal. Unless the Government has the support of the Dominions it cannot expect the British Taxpayer to finance the building of big experimental airships to beat the new American Goodyear-Zeppelins.

Moreover no single British manufacturing firm can be expected to spend more money on airships. There is a rumour based on good information which says that Vickers Ltd. lost something like £200,000 in financing the Airship Guarantee Co. Ltd. which built R.100. That seems very likely for there is all the difference in the World between building a straightaway production job and building a thing the design of which has to be altered continually in the light of new knowledge and new ideas.

Probably a new R.100 could be built at a profit at the original contract price. Or perhaps even a much-improved R.100 could now be built at a profit for the same money. But in the meantime without any guarantee from the Government we cannot expect Vickers Ltd. or any other engineering firm to build a new ship as a speculation.

Because there is no fresh contract for the Airship Guarantee Co. Ltd. and because Vickers Ltd. naturally do not feel inclined to build a new ship as a speculation the Airship Guarantee Co. Ltd. must necessarily pass out of existence. Apparently this is practically the decision of the shareholders because already a number of people know that the whole staff of the Airship Guarantee Co. Ltd. are under notice to quit at the end of November.

The Government and the Imperial Conference together could save the situation by ordering a new ship to replace R.101. This would be the only reasonable thing to do because the whole of the design staff of R.100 are happily still alive and unhappily the chief members of the design staff of R.101 died with the ship.

The next few weeks therefore will see whether our present Government is as faint-hearted in its outlook on mechanical progress as it has shown itself to be in dealing with rebellious subjects over-seas and in dealing with the still greater problems of unemployment and Imperial trade.

### What We Won't Do.

So far as R.101 herself is concerned, she is no great loss. Like R.100 she was frankly an experiment, and not an expensive one as such things go,—compared with war-ships and steam-ships, numbers of which have been far worse failures technically, and far more murderous in their failure.

The accident disproves the old foolish claim that heavy-oil engines plus hydrogen are any guarantee of safety. Petrol engines plus helium would seem to be much safer,—for petrol can easily be dumped outboard if an accident seems likely.

Helium is the only real guarantee of safety. Our good friend Admiral Moffett, U.S.N., Chief of the Navy's Air Bureau at Washington, generously advocates the removal of the ban on exporting helium from the United States, so that we may fill our new ships with that uninflammable gas. We are duly grateful to him for his sportsmanship and good-fellowship.

But in fact there is if anything more helium to be got in Canada than in the United States, if only we will take the trouble to get it. Certain areas in Western Canada, round about that "city" which bears the delectable name of Medicine Hat, are as full of natural gas as any area in the United States,—including Congress itself. Helium is got from natural gas, so if the States can fill their ships with helium Canada can fill ours. Also there is natural gas somewhere down in Sussex, where the local railway station and neighbouring houses are lit by it.

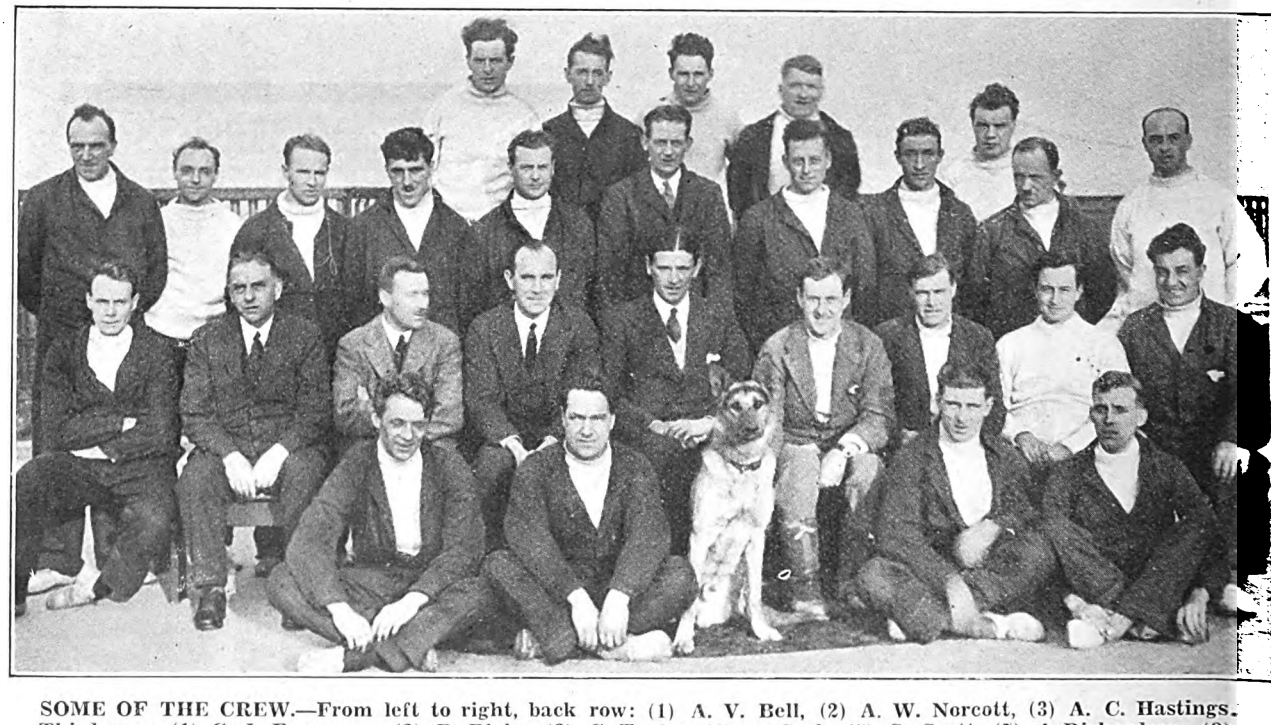
The extraction of helium from natural gas is at present more or less a laboratory trick. But the Americans have nearly commercialised it.

The extraction of nitrogen from air was just as much a laboratory trick before 1914, but our blockade of Germany forced the great German chemists to use their brains, and so in a year or two Germany pulled enough nitrogen out of the air not only to make her explosives but to fertilise her fields.

Forty years ago the extraction of aluminium from dirt was equally a laboratory trick. To-day aluminium is nearly as cheap as the dirt from which it comes. And to-day beryllium, which will give us an alloy lighter than aluminium and stronger than heat-treated steel, is gettable on the same terms as aluminium was forty, or at any rate fifty, years ago.

If we set to work now, as Germany did in 1915 in that affair of the nitrogen, and made up our minds to have helium and beryllium at all costs of labour and brains, we should be able to build within five years an unburnable airship so light that it would make air transport as good a commercial proposition as any in the World.

But being English we won't. So why worry? Let us go on paying doles to the unemployed instead. Save lives by being progressive? We would rather die first.—C. G. G.



SOME OF THE CREW.—From left to right, back row: (1) A. V. Bell, (2) A. W. Norcott, (3) A. C. Hastings. Third row: (1) C. J. Fergusson, (2) R. Blake, (3) C. Taylor, (4) A. Cook, (5) S. Scott, (7) A Richardson, (8) W. King, (9) G. Shortt, (11) A. Disley. Seated: (2) W. R. Gent, (3) Flg. Off. Steff, (4) Sq. Ldr. Johnston, (5) Flt. Lt. Irwin, (6) Lieut.-Cdr. Atherstone, (7) G. W. Hunt, (8) W. A. Porter, (9) W. Moule. Bottom row: **(1) H. E. Ford, (2) M. Rampton.**

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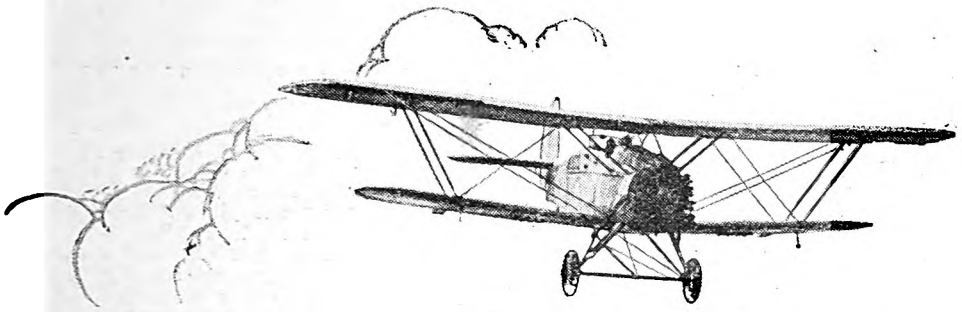

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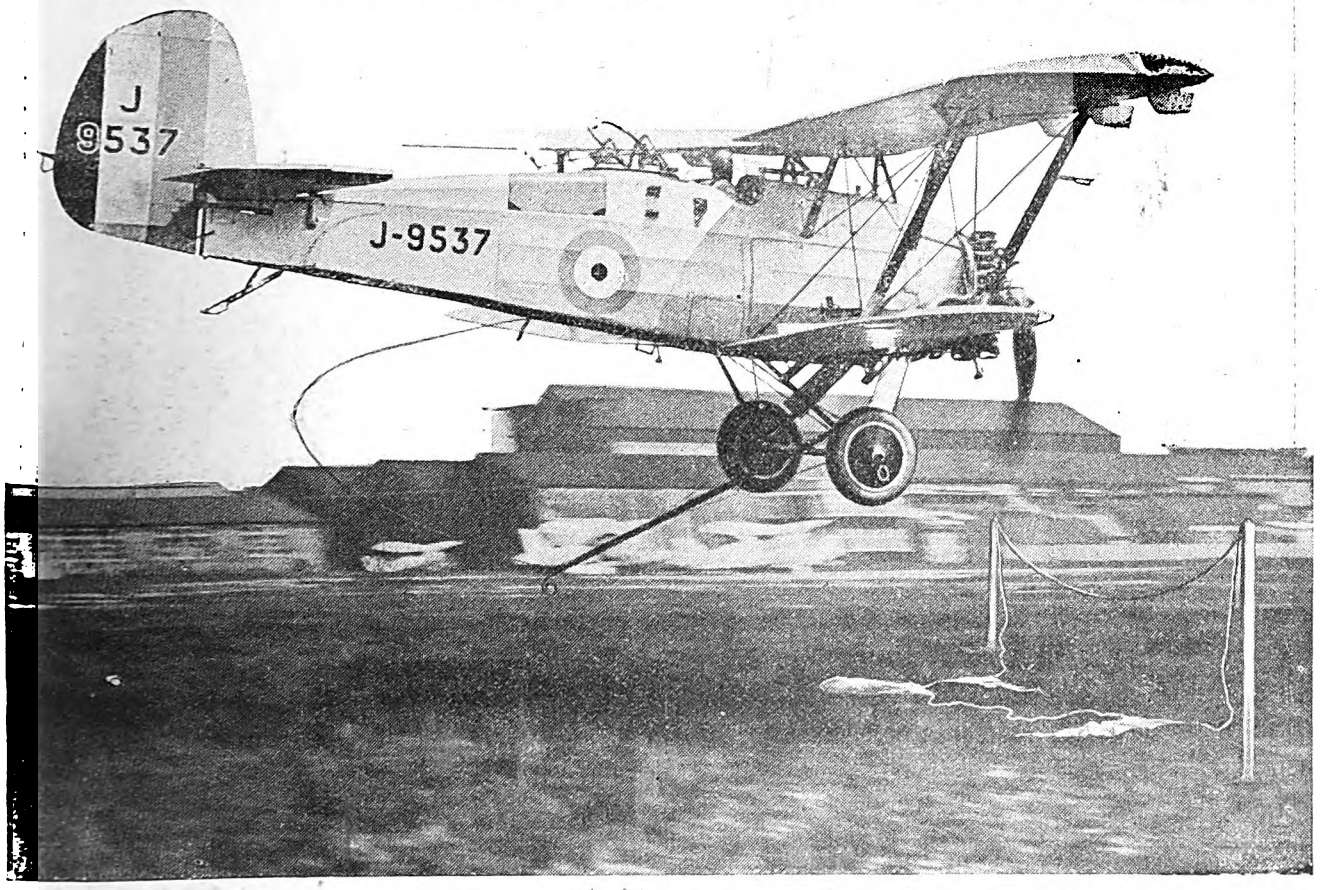





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## SEFTON BRANCKER.

Few of those many who have come to know Sefton Brancker of late years as the ideal Director of Civil Aviation of the moment know the true debt which this Nation owes to him. They think of him as a cheery soul, the life of the party at a flying meeting, and after, who at the same time had one side to his character which was strong enough and serious enough to thrust aside or cut through official regulations and get things done in a fraction of the time which would be taken by a typical Permanent Civil Servant. But they do not think of him as one of the men who did most to save the British Army in those difficult days of 1914 and early 1915. And yet that is his greatest claim to our admiration and gratitude.

In those days, when the historic first four squadrons of the Royal Flying Corps flew to France with every flyable aeroplane in this country, and Lt.-Col. Hugh Trenchard, just promoted from Major, was left behind at Farnborough with a row of empty sheds and a few invalid officers and men to build up a new Flying Corps, Major Brancker was at the War Office in the new Department of Military Aeronautics. On him fell the task of getting the material that Col. Trenchard needed, and he went at the job with all the energy and freedom from convention which was part of his nature.

The War Office at that time was perhaps more correct and conventional than it is now. Though it was not so hidebound as its enemies pretended, it was at any rate as bound by red tape as the Post Office is to-day,—and most civilians know what that means. Brancker just defied routine, ignored departments and sub-departments which hindered progress, and got things done in his own free and easy way.

There is an old saying that the time finds the man,—and certainly the right men were found in Col. Trenchard and Major Brancker. Some few years later General Trenchard, on the strength of his experiences in Nigeria, described himself, to give force to an argument, as "a bush-whacker by trade." As such none knows better when to cut through conventions. So he appreciated Brancker's buccaneering methods. And we have a very recent dictum of Marshal of the R.A.F. the Lord Trenchard that no man did as much to build up the Royal Flying Corps as did Sefton Brancker. None could wish for a better epitaph.

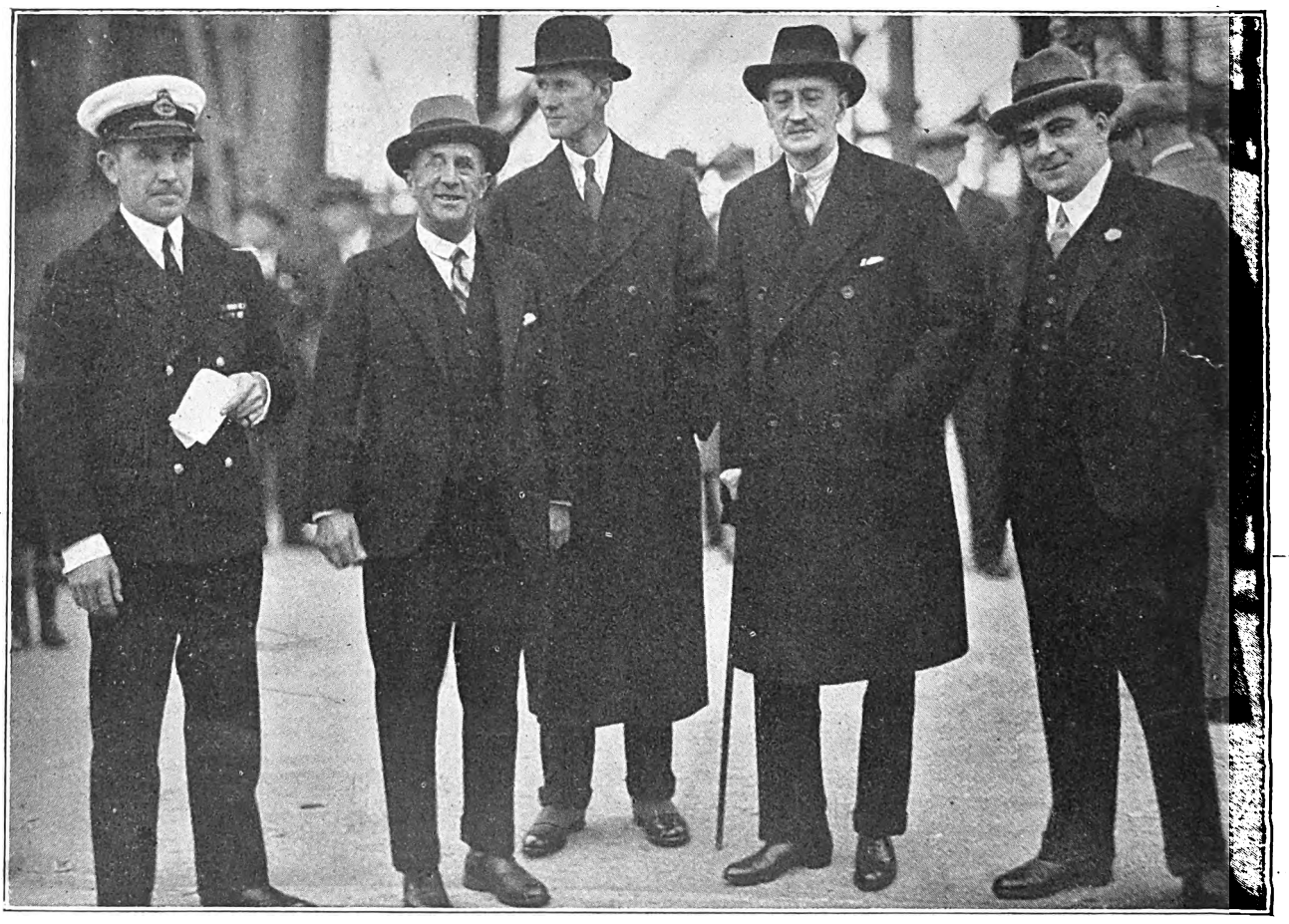
During his periods of command in the field, of a wing and of a brigade, at later stages of the War, Brancker did consistently well, and deserved all his promotion, and proved that he was by no means merely an efficient and unconventional office-wallah.

He flew constantly, and he was very nearly the worst pilot in the R.F.C.,—of which he was characteristically unashamed. There is a perfectly authentic story of a young instructor at one of the training schools who, when an aeroplane landed disgracefully and taxied up to the sheds, rushed out to it and bellowed at the pilot, "B—— rotten landing. Go up and do it again." The pilot obediently opened his throttle, turned round, took off, and landed a trifle less badly. He climbed out, took off his flying coat, disclosing the uniform of a Brigadier-General, and remarked amiably to the dumbfounded instructor, "You're quite right. It was." And General Brancker proceeded about the business for which he had come.

A Brancker landing became a standard description in the R.A.F., and after the War, when Civil Aviation and landing-fees came into being, some ex-R.A.F. pilot remarked that if General Brancker were charged a landing-fee for every bump he would ruin himself in a week. And, naturally, none enjoyed the jest better than did Brancker.

When Mr. George Holt Thomas, with his immense foresight and enterprise, formed Air Transport and Travel Ltd., as soon as Civil Aviation was allowed after the War, General Brancker joined him and helped to organise the first regular London-Paris air-line. He gave up piloting himself, because civil aircraft are in a way more precious than war-machines, but he flew as a passenger with the same disregard for his personal comfort and safety. Though, be it said, the A.T. and T. pilots were the finest in the World, they ploughed through weather, in their effort to prove the value of air transport, which would shake the pilots of to-day,—and they had no luxuries such as radio-telephones and turn-indicators. And Brancker flew with them whenever business called.

In a way, perhaps, he took less risk than he has done in recent years, when he has flown all over the country and the Continent in all sorts of aeroplanes with all sorts of pilots, who have far less experience than had the old A.T. and T. crowd. But personal risk has never entered his calculations from the day when as a Staff Officer he made his first flight with Henri Jullerot in a Bristol box-kite over Indian jungle in 1910, and became the first British officer



**BEFORE THE START.—Left to right: Sq. Ldr. Johnston; Air Vice-Marshal Sir Sefton Brancker; Mr. Reynolds, Lord Thomson's Secretary, who did not travel in the ship; Lord Thomson; and Lt.-Col. Richmond.**

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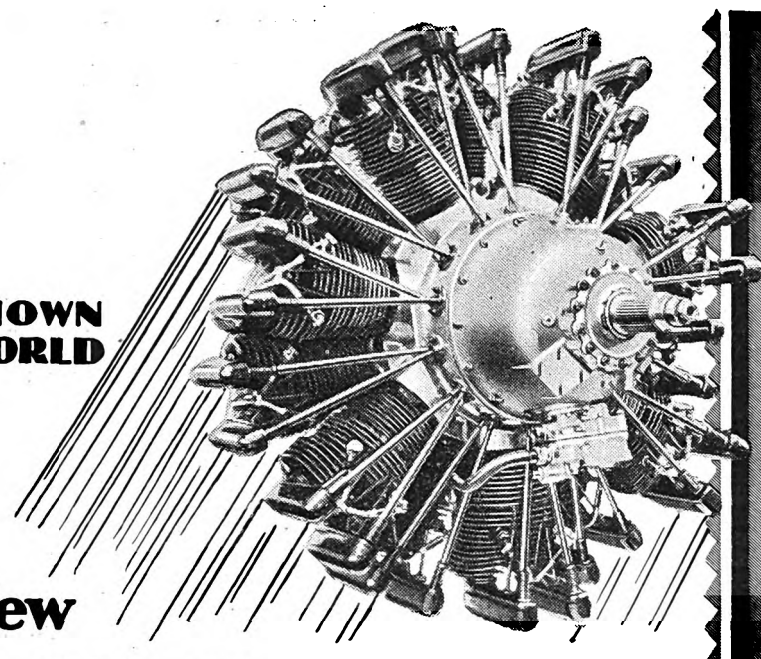

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and the first Englishman to fly in India, till he went aloft for the last time in the doomed R.101.

In the post-War slump A.T. and T. Ltd. fell on evil days, and soon afterwards Sir Frederick Sykes, now Governor of Bombay, vacated the office of Controller-General of Civil Aviation. The new, and less exalted, office of Director of Civil Aviation was created, and Brancker was appointed to it.

Here, though in quite a different way, he was able to serve the country, and the Empire, as when he helped to rebuild the R.F.C. On the principle that there are always better fish in the sea than ever came out of it, there might have been a better D.C.A., but anyone would find difficulty in imagining what manner of man he might have been, and what qualities he would have had to have which Brancker had not.

His War Office work and his Staff experience in the field had taught him all about how to defeat Government Departments and ultra-conservative Civil Servants and Cabinet Ministers. His flying had taught him all about aviators and their irritating temperamental ways. His time with A.T. and T. Ltd. had taught him the difficulties of operators of air transport. His undefeatable gaiety enabled him to cope with all his official troubles without breaking his heart over our national stupidity and lack of enterprise. His unconventionality and his gift of friendship enabled him to deal successfully with that curious mixture of gentlefolk, sportsmen, commercial magnates, petty shopkeepers, toughs, stiffs and outright cads which constitutes the body known collectively as Civil Aviation.

Perhaps his weakest characteristic as D.C.A. was his tolerance. There were times when, purely officially, he might have done good by biting hard certain offenders against the Air Navigation Laws,—for there are some people who do not respond to kindliness and are only amenable to strict discipline.

On the other hand, the good he has done can never be properly estimated. Thanks to him, the Flying Club movement, originated by Sir Geoffrey Salmond and so carefully fostered by Sir Samuel Hoare, has flourished in a way which is the envy of all other nations. The United States, with all their money, have nothing like it, and France to-day is trying to imitate it by practically paying half the price of his machine to every private owner.

Brancker has fought for the continuation and extension of subsidies in a way which would have lost most officials their jobs. He has nursed the Clubs like a mother, and he has talked to them like a father. He has been to pretty nearly every flying meeting in the country since he has held office. And he was regarded as a personal friend by every official of every club. He has made hugely amusing and yet practical and sensible speeches at all their dinners, and he has danced in his own strenuous style with all their women-folk. Small wonder that he came to be regarded as the prime mover or power-plant of Civil Aviation.

Abroad Brancker was just as valuable an asset. He spoke foreign languages as badly and as recklessly as he flew, and he got away with it just as successfully. At International Conferences on aviation his combination of practical common sense and sportsmanship, plus his air and his eyeglass, went down wonderfully well. And he never let any foreigner think that British Aviation was anything other than the very best in the World.

Those of us in Civil Aviation who have had so much to do with him for the past ten years will find difficulty in imagining how Civil Aviation will run without him. Sefton Brancker had multitudes of friends. He can have had few enemies. Probably his worst enemy was himself, in that many people who did not understand him quite mistook his curious pose, when off duty, as the chronic bad boy of the family. He worked furiously hard, and he played as furiously, and he took an almost equal pride in each. So he rather liked to be chaffed in after-dinner speeches as the man who never went to bed.

His energy was seemingly inexhaustible. He could do a man's day's work in his office, fly hundreds of miles, dance all night, and turn up merry and bright for work in the morning, and do it all over again.

His was a most confusing character. Perhaps the very last argument I had with him provides the key to it. We had been discussing the fitness of a certain person to do a certain job, and I had argued that the person was hereditarily incapable of it. Brancker's retort was that if there was anything in heredity he would have been Bishop of Honolulu, and he was prepared to prove it. Somehow the mental picture of him as a bishop, complete with eyeglass, and a congregation in the national costume, struck us both as really funny, and not so very incongruous. But it ruined our argument.

We shall all miss him terribly. And yet, after all, the manner of his death might have been worse. If he had been killed in an aeroplane crash, as he well might have been, considering how he flew with any and every pilot who happened along, the effect on civil flying, and especially private flying, would have been disastrous. He was certainly not cut out for a peaceful old age in a state of senile decay. Death in an ordinary illness would have been incongruous. That he should go in the fulness of his powers and of his popularity is far better.

There is something in the theory, first made popular in that very good book, *The Bridge of San Luiz Rey*, that each of us dies at the right time. Perhaps Civil Aviation no longer needs a leader of Brancker's type. Perhaps we have come to the time when government by the Civil Service is best for us,—irksome as the idea may seem. Whatever may be, we must recognise the debt that we owe to Sefton Brancker. And those of the younger generation of his friends who called him familiarly "Little Branks" may be the better for understanding that in him they have known at any rate one man who has done good work as a soldier and as a civil servant for his King and for the people of this Empire.—C. G. G.

## LORD THOMSON.

Brigadier-General Thomson, created Baron Thomson of Cardington so that he might have a place in Mr. Ramsay MacDonald's first Cabinet, was a newcomer to British Aviation a few years ago. And like most converts he became more fervent than those brought up in the faith.

To him we owe the revival of activity in building airships, for in his first term of office he proposed a grandiose scheme for a fleet of airships which actually had to be cut down by Sir Samuel Hoare, his Conservative successor. That he should die in the Government-built ship of which he was the first begetter is surely a strange freak of Fate. But, in spite of being a politician, he was a man and a soldier, and he would be the first to declaim, as he so well knew how, against any forsaking of the airship programme which he himself composed.

Airships were Lord Thomson's first aeronautical love and he never wavered in his affection. But he dallied at times with aeroplanes. He recognised their uses in War,—for although he was part of a Pacifist Government he had no illusions about the much-preached universal peace, or a World-wide League of Nations, or any nonsense of that sort. Like all professional soldiers he disliked War, but he knew the need for it at its proper time, and he did all he could among his pacific or parsimonious colleagues in the Cabinet to press forward the proper equipment of the R.A.F.

In the R.A.F. itself Lord Thomson was not so well known as was his predecessor, Sir Samuel Hoare, who for all his Quaker descent and quietude of manner, seems to be very deeply attached to the Militant side of Aviation,—though he has the credit of being the first Cabinet Minister to journey to far countries by civil air routes. Lord Thomson seemed to prefer rather the Civil side, and his most eloquent speeches were made in favour of air transport in general and of his beloved airships in particular.

As a speaker we have had none in British Aviation to approach him. He had a pleasing voice and manner, and there was a literary quality in his choice of words and phrases which is almost entirely absent from the speeches of almost all politicians. He was evidently his own best critic, and there was much justice in the judgment of one who, hearing him for the first time, remarked,—"How he enjoys every word he speaks." And, be it understood, his enjoyment of his own speeches added to rather than subtracted from the enjoyment of his hearers.

There is no doubt that in his short period with us Lord Thomson has done much for British Aviation. As a close friend of Mr. Ramsay MacDonald he has naturally influenced our Prime Minister in the right direction. As a Socialist he has, perhaps, regarded subsidies, or doles, to Flying Clubs more favourably than they might have been regarded by a commercially-minded individualistic Tory, who might have argued that a business proposition should, as Mr. Churchill said, fly by itself.

As a Secretary of State Lord Thomson in his first term of office came as a great relief to those who did not know what to expect from Great Britain's first Labour Government. As the product of a public school and "The Shop" he did at any rate speak the same language as themselves, in spite of his strange political views.

On the whole he got along very well with everybody and interfered very little with Service or Civil Aviation. He was a likeable and companionable man to meet casually, and an interesting and amusing conversationalist. As a gunner officer he knew enough about machinery to ask intelligent questions about aircraft. He remembered what he was told. And he did not pretend to knowledge.

Those who profess to have political information have written since his death that he was intended to be Viceroy of India, in replacement of Lord Irwin. Again the hand of Fate may have intervened on purpose. It is perhaps better that instead of going down to History as a failure in India our friend Lord Thomson should be remembered as an amiable and useful Air Minister.—C. G. G.

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# THE DISASTER TO R.101.

The British Airship R.101, which left the mooring mast at Cardington, Bedfordshire, at 19.58 hours on Oct. 4, in an attempt to fly to Egypt and India, struck the ground near Allone, close to Beauvais, France, at 02.05 hours on Oct. 5, and was totally destroyed by fire. The airship carried a complement of 54 passengers and crew, of whom 47 were killed.

The R.101 was removed, early in the morning of Oct. 1, from the shed where she had undergone extensive alterations, to the Cardington mooring mast. At 16.30 hours the same day she left for a trial flight which was made over London and the East Coast during the night. After a sixteen-hour flight the airship was again moored, about 08.30 on Oct. 2.

Except for an oil cooler that failed to work satisfactorily on one of the engines everything seemed quite sound and examination of the slight trouble gave no cause for anxiety or postponement of the Indian flight. The new bay seemed not to have any adverse effect upon her stability and control. Because of this alteration R.101 was the largest and longest airship in the world, with a capacity of 5,500,000 cub. ft. and a length of 777 ft.

On Saturday evening the flight to India was started amid expressions of confidence, in spite of windy and wet weather. The airship passed over London soon after 21.00 hours with all well. The following messages, which were sent out from the airship at the times stated, are as accurate a history of her progress as can be got at present. They were received at Cardington.

9.21 *p.m.* (*B.S.T.*).—Over London, moderate rain, base of low cloud 1,500 ft.; wind, 240 deg., 25 miles an hour; course now set for Paris. Intend to proceed *via* Paris, Tours, Toulouse and Narbonne.

10.47 *p.m.*—At 10.35 crossing coast in the vicinity of Hastings. It is raining hard, and there is a strong south-westerly wind. Cloud base is at 1,500 ft. After a good getaway from the mooring tower at 7.30, ship circled Bedford before setting course. Course was set for London at 7.54. Engines running well at cruising speed gave 54.2 knots (62 miles). Reached London at 9 o'clock, and then set course for Paris, gradually increasing height so as to avoid high land. Ship is behaving well generally, and we have already begun to recover water ballast.

12.36 *a.m.*—Crossing French coast at Pointe de St. Quentin; wind 245 deg. true, 35 miles an hour.

1 *a.m.*—15 miles south-west of Abbeville, course and speed made good from 7.30 various, 33 knots (38 miles) an hour; altimeter height, 1,500 ft.; air temperature 51 degrees; intermittent rain; cloud nimbus at 500 ft.; conditions since departure similar; temperature uniform. After an excellent supper our distinguished passengers smoked a final cigar, and, having sighted the French coast, have now gone to bed to rest after the excitement of their leave-taking. All essential services are functioning satisfactorily. The crew have settled down to watch-keeping routine.

Croydon Aerodrome Control Tower had also been in touch with R.101 and was signalled at 01.08 with thanks for assistance rendered. At 01.23 Croydon signalled back that the operator was remaining on watch.

A little later the airship was heard to be asking Le Bourgêt for her position by the direction-finding system, and was told that she was about one kilometre north of Beauvais.

Some few minutes later, about 02.00 hours, when just south of Beauvais, and near the village of Allone, the airship struck the ground and was totally destroyed by fire. Le Bourgêt, having heard no signals after receiving acknowledgment of the position reading, communicated with Beauvais aerodrome and were told that an explosion had occurred not far from the town.

No signals of distress had been sent out and there was nothing to show that any of the crew had reason to suspect anything wrong. The airship hit in a nose-down position on the crest of a low hill. Nothing could be done for the passengers and crew by those who hurried to the spot, for the fire swept the whole structure with almost explosive rapidity.

Those who lost their lives in the disaster were:—

Brigadier-General the Rt. Hon. Lord Thomson, P.C., C.B.E., D.S.O., Secretary of State for Air.

Air Vice-Marshal Sir W. Sefton Brancker, K.C.B., A.F.C., Director of Civil Aviation.

Wing-Commander R. B. B. Colmore, O.B.E., R.A.F., Director of Airship Development.

Lieutenant-Colonel V. C. Richmond, Assistant Director of Airship Development (Technical).

Major G. H. Scott, C.B.E., A.F.C., Assistant Director of Airship Development (Flying).

Major P. Bishop, O.B.E., Chief Inspector, Aeronautical Inspection Department, Air Ministry.

Squadron-Leader F. M. Rope, attached to Directorate of Airship Development.

Flight-Lieutenant H. C. Irwin, A.F.C., R.A.F., Captain of the Airship.

Squadron-Leader E. L. Johnston, O.B.E., A.F.C., R.A.F., Navigator.

Lieutenant-Commander N. G. Atherstone, A.F.C. (R.N., Ret.), First Officer.

Flying-Officer M. H. Steff, R.A.F., Second Officer.

Mr. M. A. Giblett, M.Sc., Superintendent of Airship Division, Meteorological Office.

Mr. A. Bushfield, Aeronautical Inspection Department.

Squadron-Leader W. H. L. O'Neill, M.C., R.A.F., representing the Secretary of State for India.

Squadron-Leader W. Palstra, M.C., Royal Australian Air Force.

Mr. J. Buck, Attendant to the Secretary of State for Air.

J. K. Atkin, W/T operator.
R. Blake, Engineer.
C. A. Burton, engineer.
C. J. Ferguson, engineer.
H. E. Ford, rigger.
P. A. Foster, rigger.
W. R. Gent, A.F.M., first engineer, R.101.
E. A. Graham, cook.
A. C. Hastings, engineer.
F. Hodnett, assistant steward.
G. W. Hunt, A.F.M., chief coxswain.
S. T. Keeley, chief W/T operator.
T. A. A. Key, charge-land engineer.
W. H. King, engineer.
F. Elliott, W/T operator.
M. F. Littlekit, engineer.
C. H. Mason, assistant coxswain.
J. W. Megginson, galley boy.
W. Moule, engineer.
A. W. J. Norcott, rigger.
L. F. Oughton, assistant coxswain.
W. A. Potter, assistant chief coxswain.
M. G. Rampton, rigger.
A. J. Richardson, rigger.
E. G. Rudd, rigger.
A. H. Savidge, chief steward.
S. E. Scott, charge-land engineer.
G. W. Short, charge-land engineer.
C. E. Taylor, rigger.
A. H. Watkins, engineer.

There were eight survivors, of whom five were seriously injured. They are W. C. Radcliffe, rigger; S. Church, rigger; A. J. Cook, engineer; A. Disley, wireless operator; V. Savory, engineer. (Radcliffe died in hospital at Beauvais on Oct. 6.) The less badly hurt are H. J. Leech, foreman engineer, R.A. Works, Shortsdown, Cardington; A. V. Bell, engineer, and J. H. Binks, engineer.

His Majesty the King sent to the Prime Minister the following message on the morning after the disaster:

"I am horrified to hear of this national disaster which has befallen Airship R.101, and the consequent serious loss of life, including that of Lord Thomson, my Air Minister. The Queen and I sympathise deeply with the relatives and friends of those who have perished in the service of their country and also with the injured survivors.—George, R.I."

A Royal message was also sent in reply to the Lord Mayor of London, who had expressed the sympathy of the citizens of London.

"I thank you, my Lord Mayor, for the kind message of sympathy you have sent me from the citizens of London in this national calamity, resulting in the death of many gallant men whose untimely fate we all deplore.—George, R.I."

The Prime Minister made the following statement on Sunday morning:

"I am grieved beyond words at the loss of so many splendid men, whose sacrifice has been added to that glorious list of Englishmen who, on uncharted seas and unexplored lands, have gone into the unknown as pioneers and pathfinders, and have met death. My most heartfelt sympathy goes out to their families in this hour of their bereavement.

"Only those who have been associated with Lord Thomson know how much the country has lost. To me, no one can now fill his place of genial companionship and friendship."

### International Condolences.

His Majesty the King has received messages of sympathy from Their Majesties the Kings of Belgium, Denmark, Egypt, Italy, Sweden, Norway, and the ex-King of Portugal; The Regent of Hungary; The Presidents of France, Switzerland, Portugal and Lithuania; and the Governor-General of Australia.

The Prime Minister has received messages of condolence from Mr. Stimson, the U.S. Secretary of State; Signor Mussolini; Lord Willingdon, Governor-General of Canada; the Prime Minister of Australia, and the Prime Minister of Newfoundland. The Governor of South Australia, the acting Prime Minister of South Africa, the Maharajah of Patiala and many others have conveyed their sympathies.

Dr. Hugo Eckener, chief of the Zeppelin Co., asked Mr. Ramsay MacDonald to accept his sympathy and that of the crew of *Graf Zeppelin* in the following terms:—

Deeply moved by the tragic fate of so many men of the English nation remarkable for their striving towards an ideal I ask your excellency to accept my heartfelt sympathy. The crew of the *Graf Zeppelin* mourn sincerely in united comradeship.

Mr. MacDonald replied:—

Please accept my very sincere thanks for your sympathy in our national loss. The message of sympathy and fraternity from yourself and the crew of the *Graf Zeppelin* will be very genuinely appreciated by the relatives of those who have lost their lives and by the Service to which they belong.

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M. Tardieu, Premier of France, communicated as follows:—

I wish to assure you of the sad emotions which this disaster has caused the Government. The death of my friend, Lord Thomson, who died at his post, causes me great sorrow.

M. Bouché, of our valued contemporary *L'Aéronautique*, has telegraphed to THE AEROPLANE:—

*Prenons part émue au deuil aéronautique britannique.*

As Minister of the Interior, M. Tardieu has decreed that a day of national mourning shall be observed on Oct. 7, when all civil and military authorities will fly flags at half-mast and appropriate ceremonies will be observed.

The bodies of the 48 victims of the disaster were brought to London from Beauvais by special trains and in H.M. destroyers *Tribune* and *Tempest*. Identification with certainty is practically impossible with the majority of them, and the proposal to inter them together at or near Cardington is being considered.

A memorial service will be held in St. Paul's at noon on Oct. 10.

## BIOGRAPHICAL NOTES.

### Lord Thomson.

Christopher Birdwood Thomson, 1st Baron Thomson of Cardington, was born in 1875, the son of Major-General Thomson, R.E. He was educated at Cheltenham and the R.M.A., Woolwich, and joined the Royal Engineers in 1894. He served in the Mashonaland operations of 1896 and in the South African War of 1899-1902.

On his return from South Africa he was appointed assistant instructor at the Engineering School at Chatham. In 1906 and 1907 he served in West Africa and in 1909 he entered the Staff College. After the Staff College he was appointed to the Directorate of Operations at the War Office. As War Office representative he witnessed the Balkan Wars of 1912-13.

On the outbreak of the War 1914 Major Thomson sailed for France on the H.Q. Staff of the British Expeditionary Force and served as liaison officer. For a few weeks he was attached to Belgian Headquarters and was then appointed to the Staff of the 1st Corps of the B.E.F.

In 1915 he was sent to Bucharest as Military Attaché, and, after the entry of Roumania into the War, as head of the British Mission. He returned to England in May, 1917, and after a few weeks at the War Office, he went to Palestine as C.R.E. of the 60th Division. He was awarded the D.S.O. for his part in the Jericho operations. He returned to France in the Spring of 1918 and was appointed to the Supreme War Council at Versailles.

In the autumn of 1919 he retired from the Army with the rank of Brigadier-General and joined the Labour Party. He stood for Parliament in the Labour interests in 1922 and again in 1923 and was both times defeated. When the Labour Party came into office in January, 1924, he was placed at the head of the Air Ministry, and was at the same time created Lord Thomson of Cardington.

As Secretary of State for Air he was responsible for a rise of nearly 20 per cent. in the Air Estimates of 1924-25 and it was chiefly owing to his energy that the Government took over airship development.

During his term of office he visited, largely by air, many Royal Air Force and civil air stations at home and abroad.

From 1926 to 1928 he was Chairman of the Royal Aero Club.

After the fall of the Labour Administration he played a vigorous part in the debates in the House of Lords and when Labour returned to office in 1929 he returned to his post as Secretary of State for Air.

Lord Thomson was the author of a number of books, including "Air Facts and Problems," a valuable contribution to the literature dealing with the development of civil air transport.

### Sir Sefton Brancker.

William Sefton Brancker was born in 1877, the eldest son of the late Colonel W. G. Brancker, C.B., R.A. He was educated at Bedford and the R.M.A., Woolwich, and joined the Royal Artillery in 1896. He served in the South African War in 1900 and was wounded and mentioned in despatches.

From 1903 to 1912 he served in India in Artillery and Staff appointments and during this period made his first flight, which was also the first flight ever made by a British officer in India. The British and Colonial Aeroplane Company had sent three 50 h.p. Bristol box-kites to Calcutta for demonstration to the General Staff. The pilot was Henri Jullerot, and there were two English mechanics. Captain Brancker, as Quartermaster-General of the Presidency Brigade, was in charge of the disembarkation of the party and his interest was so keen that he was allowed to make a flight as an observer. This was in the winter of 1910.

In 1913 he was appointed to the War Office where he was employed under General Henderson, then Director of Military Aeronautics. He learned to fly on a Vickers biplane at Brooklands and his Royal Aero Club certificate No. 525 is dated June 18, 1913 After a short course at the Central Flying School he was appointed to the Royal Flying Corps Reserve.

In October, 1913, he succeeded Captain Ellington on the Staff of the newly-formed Directorate of Military Aeronautics. He continued flying and in June, 1914, flew the first B.E.2c from Farnborough to Upavon without the use of his hands except to throttle back before alighting.

On the outbreak of the War 1914-18 he was Deputy Director of Military Aeronautics and in 1916 and 1917 he was Director of Air Organisation.

Towards the end of 1917 he was appointed to command the Middle East Division of the Royal Flying Corps in Egypt, Palestine and India. On the formation of the R.A.F. in April, 1918, he was appointed Controller-General of Equipment and Master-General of Personnel on the Air Council with the rank of Major-General.

Shortly after the Armistice he resigned from the R.A.F. and in January, 1919, he joined Air Transport and Travel

**Sir Sefton Brancker and some of the crew of R.101.**

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Ltd., which had been formed by Mr. G. Holt Thomas as the operating branch of the Aircraft Manufacturing Co. Ltd.

In May, 1922, he was appointed Director of Civil Aviation to the Air Ministry, and from this post gave valuable encouragement to aviation in all its branches. In November, 1924, he flew to India and Burma, to survey the projected air route. By the time he returned home in March, 1925, he had travelled 17,000 miles by air.

Major-General Brancker was created a K.C.B. in 1919.

He was British Representative on the International Commission on Air Navigation and President of the Institute of Transport in 1928-29. He was gazetted Air Vice-Marshal in the Reserve of Air Force Officers in 1924.

**Wing Commander Colmore.**

Reginald Blayney Bulteel Colmore was born in 1887 and was educated at Stubbington House, Fareham, and in H.M.S. *Britannia*. On the outbreak of the War 1914-18 he was mobilised and appointed Lieutenant-Commander.

He served with the Armoured Car Division in Antwerp in 1914 and in 1915 he commanded the armoured car section in Gallipoli. Later in that year he was the commanding officer in the first campaign against the Senussi on the Egyptian borders.

In 1916 he was transferred to the Airship Section of the R.N.A.S. and was appointed to command the Airship Base at Mullion. While in this command he evolved a scheme of dealing with enemy submarines by a system of combined patrols of airships, seaplanes, and aeroplanes in conjunction with surface craft.

On the formation of the R.A.F. in 1918 he was appointed 1st Class Staff Officer, Aircraft Operations, Plymouth, with the rank of Lieutenant Colonel. He was later posted as Chief Staff Officer, Aircraft Operations, with the Grand Fleet based at Dundee.

In 1919 he was appointed to a permanent commission in the R.A.F. with the rank of Squadron Leader and was attached as Staff Officer for Airships to the Department of the Controller General of Civil Aviation at the Air Ministry.

In 1924 he was appointed Deputy-Director of Airship Development and became Director of Airship Development in 1930, with the rank of Wing Commander. He was seconded from the R.A.F. for this duty.

**Lieutenant-Colonel Richmond.**

Vincent Crane Richmond was born in 1893 and was educated at the Royal College of Science. He joined the Royal Naval Air Service in 1915 and was engaged until the end of the War 1914-18 on the construction of non-rigid airships. In 1920 he went to Germany with the Inter-Allied Commission of Control and during part of the time was in charge of the Naval sub-commission for the surrender of airships and seaplanes. In 1921 he was appointed to the Airship Research Department of the Air Ministry.

From 1923 to 1924 he was in charge of the Material and Research Branch of the Air Ministry and since 1923 he has also been a lecturer in airship design and construction at the Imperial College of Science.

In 1924 he was appointed to the Royal Airship Works as officer in charge of design and research. In 1930 he was appointed Assistant Director (Technical) of Airship Development.

**Lieutenant Commander Atherstone.**

Lieutenant Commander N. G. Atherstone, A.F.C., R.N. (Retired) was transferred to airships from the Grand Fleet in 1917 and became a pilot of non-rigids, S.S., Zero, and N.S. types. In 1918 he was appointed first officer of R.29 and was awarded the A.F.C. He returned to the Royal Navy in 1919 and retired in 1920. In 1927 he was appointed to the Royal Airship Works for airship duties. He was appointed first officer in R.101 in 1929.

**Squadron Leader O'Neill.**

Sq. Ldr. W. H. L. O'Neill, M.C., R.A.F., transferred to the Royal Flying Corps from the Indian Army during the War 1914-18. In March 1918 he was awarded the Military Cross for Distinguished Service in the Field. In August 1919 he was appointed to a permanent commission in the R.A.F. with the rank of Flight Lieutenant. In September 1920 he was posted to No. 5 Squadron, India, and in December 1922 he was restored to the Home Establishment and posted to No. 100 Squadron, then at Spittlegate.

He was promoted to Squadron Leader in January 1924. In February 1924 he was appointed to Headquarters, Coastal Area, for personnel staff duties, and in August 1925 he was appointed to command No. 24 (Communication) Squadron. In September 1927 he was posted to the Aircraft Depot, Karachi, as second in command.

Squadron Leader O'Neill was a founder-member of the Air League of India and of the Karachi Aero Club.

**Squadron Leader Johnston.**

Ernest Livingston Johnston was born in 1891 and was educated at Tynemouth High School and at the Marine School, South Shields. He was a qualified master mariner and originally served in the Royal Naval Reserve. In 1916 he transferred to the R.N.A.S. (Airship Section) and after commanding coastal-type airships he was appointed to command the Luce Bay airship station, Scotland. On the formation of the R.A.F. in 1918 he was given the rank of Captain and was later attached to the Department of Civil Aviation for R.A.F. Communications with the rank of Flight Lieutenant.

He was placed on the R.A.F. Reserve in 1922 and in 1924 he was appointed to the Royal Airship Works for navigation duties. He was lent for a period to Imperial Airways and in 1927 he was navigator on the first Imperial Airways trip to India and back. He was navigator for R.100 as well as for R.101 and in that capacity flew with R.100 on her recent voyage to Canada and back. He was also an Air Ministry examiner for navigators' licences.

Squadron Leader Johnston recently organised the Guild of Air Pilots and Air Navigators, of which he was Deputy Master, and therein he organised a series of classes in which pilots (many of them with years of experience of airline flying) were able to study the higher technics of navigation, and so were able to qualify as navigators in accord with the new regulations of the Air Ministry. For this work alone Sq. Ldr. Johnston's name deserves to be perpetuated in the history of British Aviation.

**Squadron Leader Rope.**

Frederick Michael Rope was born in 1888 and was educated at Shrewsbury School and at Birmingham University where he took an engineering degree. Until 1912 he was an engineer to the British Electric Plant Company, Alloa. He then joined the Rio Tinto Company in London. From 1913 to 1914 he was employed on locomotive engineering by the Brighton Railway and in 1915 served in the same capacity with the Nigerian Government Railway.

In 1915 he joined the Royal Naval Air Service and served at the Capel and Kingsnorth Air Stations and later as Staff Officer in the Department of the Director of Research. From 1921 to 1924 he was Technical Staff Officer at Air H.Q. 'Iraq, and on his return to England he was appointed to the Royal Airship Works and seconded from the R.A.F. He was promoted to Squadron Leader in March, 1929.

**Major G. H. Scott.**

George Herbert Scott was born in 1888 and was educated at Richmond School, Yorkshire, and at the Royal Naval Engineering College at Keynham. He joined the Royal Naval Air Service as a Flight Sub-Lieutenant on the outbreak of War 1914-1918 and served at the airship stations at Farnborough and Kingsnorth.

In 1915 he was appointed to command the Parseval P.4. airship at Barrow and in 1917 became Captain of the R.9, the first British rigid airship to fly. On the formation of the R.A.F. in 1918 he was gazetted to the rank of Major.

In 1918 he was awarded the Air Force Cross for his work on airships and was appointed to command the R.34. He was in command of this vessel when, in 1925, it flew from Scotland to the United States and back. For this achievement he was created a C.B.E. Later in the year he retired from the R.A.F. and in 1920 was appointed to the technical staff of the Royal Airship Works at Cardington.

Major Scott did much to develop the system of mooring airships at the head of a mast or tower which is now used by the Air Ministry and in the United States.

In 1924 Major Scott was appointed Officer in charge of flying and training in the Directorate of Airship Development and in Jan., 1930, he became Assistant Director of Airship Development. He was Officer-in-Charge of R.100 when she made her recent flight to Canada and back.

**Flight Lieutenant Irwin.**

Herbert Carmichael Irwin was born in 1894 and was educated at St. Andrew's College, Dublin. He joined the Royal Naval Air Service (Airship Section) in 1915 and from 1916 to 1917 was captain of the non-rigid airships of the S.S., Zero, Coastal and N.S. types in Home Waters and in the Eastern Mediterranean. In 1920 he commanded R.33 and R.36 and the following year returned to ordinary R.A.F. duty at Service stations and in the Department of the Chief of the Air Staff at the Air Ministry.

In 1925 he was appointed to the Royal Airship Works and in 1926 he again commanded R.33 when she made the experimental flights in which technical data were collected for the design of R.100 and R.101. From 1926 to 1928 he commanded the R.A.F. School of Balloon Training at Larkhill and in 1929 he was again appointed to the Royal Airship Works to take over command of R.101.

Flight Lieutenant Irwin was a member of the British Olympic Athletic Team at Antwerp in 1920 and had frequently represented the Royal Air Force in athletic contests.

**Flying Officer Steff.**

Maurice Henry Steff was born in 1896 at Luton. He joined the Royal Navy in Sept., 1914, and served in H.M.S. *Inflexible*. He was present at the Battle of Jutland in

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While at the mast the airship was trimmed tail heavy with a considerable positive angle on the elevators. As the airship started she seemed to rise very slowly, and, whether due to engines being sluggish in taking up the load or otherwise, the ship accelerated very slowly and disappeared to the west at about 400 ft. at an apparent speed of about 20 miles per hour.

Now that R.101 has ceased to be, it may be worth while to inquire what knowledge has been gained by this experimental aircraft that has, in the end, cost so many valuable and unreplaceable lives, as well as £500,000.

Probably the outstanding new departure is the fact that for the first time in airship construction the hull was fully stressed and was made strong enough for all flying and mooring loads.

The next feature of interest is that very complete wind-tunnel tests were made of stability when pitching and yawing, with the result that the ship would hold a straight course or lie at the mast without hunting.

It is of some importance that an original type of hull framework was tested,—the first departure from Count Zeppelin's well-established design. Whether the new type of structure with rigid frames was satisfactory can only be determined by those who have access to the weights and strength of parts. To the outsider it appears that the new type of structure was very heavy. It is understood that the specific weight of the hull was very much heavier than that for R.100, which has braced frames.

The use of steel in the place of duralumin for about 25% of the framework is of interest, but not enough data on this point have been published to form any conclusions.

The structure of R.101 was made by Boulton and Paul Ltd. at Norwich to finer tolerances than have ever been worked to before in any structures of that size, with the result that the ship was assembled at Cardington both quickly and easily. It is probably the first instance of an airship being constructed in a factory about a hundred miles from the place of erecting,—a much better arrangement than the damp cold works in which R.100 was built at Howden.

The use of variable-pitch reversible airscrews has been a definite failure.

The use of eight-cylinder-in-line heavy-oil engines has proved a partial success. The engines used were out-of-date designs at the time the airship left the shed last October. The specific weight was over 8 lbs. per h.p. (dry weight), compared with between 2 and 2½ lbs. per h.p. now obtainable with American and German engines. Eight cylinders in line is the worst possible arrangement for aircraft engines: the crank-case and crank-shaft are long and heavy, the balance is poor.

The fact that no provision was made for reversing the engines until the last voyage is, to say the least, very curious. Reversible compression-ignition heavy-oil engines were successfully used before the War 1914-18.

It would be interesting to know whether the engines were true Diesel engines, in which the fuel is injected almost entirely after top dead centre, and burns slowly, maintaining a constant pressure, or the more modern form of compression-ignition engine, in which almost the whole of the fuel is injected before top dead centre. The very great weight of the engines leads one to suppose that they worked on the constant-pressure cycle.

The steam cooling appeared to be one of the best features of the power plant.

The use of reefing girders and fabric under slight natural pressure for the envelope of the hull is another novel feature the comparative value of which should be published.

It will be of great utility and interest if the specific weight of all components, in relation to passenger miles or ton miles of cargo, are published. There seems to be an idea prevalent that the R.100 is about twice as efficient and safe as the R.101 was, owing to a lighter specific weight, higher structural strength, greater engine-power, rapidity of manœuvring because of the reverse gear-boxes, etc. If re-engined with modern compression-ignition engines of about the same weight per h.p. as the petrol engines fitted it would maintain its present good performance with oil fuel.

It is to be hoped that a full analysis of all the experimental features of R.101 will be published. It would be interesting to know why so few test flights were made. Was there some part which required frequent renewal? It appears as if the flight which ended so disastrously were made just after a very complete reconstruction and modification of design with only a short test flight, which appeared to be unsatisfactory.

## THE PRESS.

The daily newspapers have, with a few notable exceptions, dealt with the R.101 after the manner of their kind. They have slopped over with slushy sentiment as a kind of sauce to their orgy of ghoulishness. They have distorted facts and drawn erroneous conclusions and filled columns with fatuities in a way which seems to indicate sheer imbecility in the writers, unless they were writing down deliberately, tongue in cheek, to the intellectual level of their editors and proprietors.

There is a proverb which says that a nation has the Government which it deserves. This country seems to be largely governed by its newspapers. In Mr. John Buchan's latest book, *Castle Gay*, the central character is a newspaper proprietor of the kind which has inflicted itself on us in the past twenty or thirty years. Of him one of the other characters in the book says:—"Who made this tripe-merchant a judge in Israel?" and later "He thinks he is a tonic and a sedative. To me he is simply emetic."

Perhaps as a nation we deserve a newspaper government of that kind. But the men who died in R.101 deserved something better from their countrymen than the sickening stuff which has been poured forth about them.—C. G. G.

## A GERMAN ACCIDENT.

On Oct. 6 a single-engined B.F.W. M.20 monoplane, belonging to the Deutsche Luft Hansa, crashed just outside Dresden Aerodrome, and all the occupants, which included pilot, wireless operator, and six passengers, were killed.

The machine was flying on the Berlin—Dresden—Prague—Vienna route. According to the Berlin correspondent of *The Times* it arrived over Dresden aerodrome at about 1,200 ft., and after gliding down some distance, it suddenly dropped a wing and dived straight into the ground from about 600 ft.

A technical Commission of Investigation has been unable to find any explanation for the accident.

[The machine is of that new taper-wing type which was mentioned in The Aeroplane recently as being the latest of Herr Messerschmidt's designs. The type is singularly interesting, and promised a distinct advance in air transport, because of its high performance. The verdict of the Commission is awaited with interest.

In the meantime all will sympathise with the *Luft Hansa* and with Herr Messerschmidt in this lamentable affair.—C. G. G.]

## MR. C. R. FAIREY'S LECTURE.

The Inaugural Lecture of the 66th annual session of the Royal Aeronautical Society will be delivered by Mr. C. R. Fairey, M.B.E., F.R.Ae.S., President of the Society for 1930-31, in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m. to-morrow, Thursday, Oct. 9.

Mr. Fairey's subject will be "The Growth of Aviation." This is his first appearance as President of the R.Ae.S. and his audience is bound to be large. So those who are wise will arrive early.

## BUSK STUDENTSHIP IN AERONAUTICS.

The Trustees of The Busk Studentship, founded in memory of Edward Teshmaker Busk, who lost his life in 1914 whilst flying an experimental aeroplane, have awarded the Studentship for the year 1930-31 to Mr. Robert Hugh Francis, B.Sc. of the University College of North Wales, Bangor.

## NO NIGHT FLYING OVER PARIS.

As a sequel to the recent crashes of French military aeroplanes at Chartres and Pontoise the Minister of Air has decreed that no aeroplanes shall fly over Paris by night no matter what their altitude may be. The reason is understood to be the excessive danger and damage which would result from aeroplanes falling within the city.

## AN AUSTRALIAN MISAPPREHENSION.

A correspondent in Brisbane has been gravely offended by the following statement which appeared in The Aeroplane in May last:—

> Australia, though potentially immensely wealthy, has practically suspended payment of all her debts, largely because of socialistic mishandling of labour problems and immigration.

He regards this as an unfair attack on the honour and credit of Australia, though he does not dispute the cause of the trouble.

Our correspondent has we think been misleading himself. If we had said that Australia had *repudiated* her debts that would certainly have been a gross libel on one of the World's most honourable nations. But Australia, very much against the will of everybody in the country, has been compelled practically to *suspend* payment of her debts, simply because there is not enough money in Australia to meet the collective liabilities of the people. We all know that those debts are going to be paid as soon as the World's markets right themselves and as soon as Australia's products can be sold. And that is why the word suspended was used.

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# BRITISH SALMSON
## AERO ENGINES

THE FAMOUS 40/50 SALMSON

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MLLE. MARISE BASTIE REMAINED IN THE AIR

**37** Hours **28** Minutes **57** Seconds

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## THE RECORD OF DURATION FOR A SINGLE PILOT IN A LIGHT AEROPLANE

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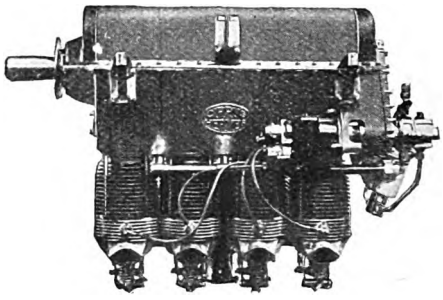
CIRRUS HERMES

## Standard or inverted engines for all Types of Light Planes.



**Supplied to the Desoutter Aircraft Co., Ltd., and as used by Flying Officers H. L. Piper and C. Kay on their successful flight from England to Australia.**

Desoutter Cabin Monoplane, fitted with Inverted Hermes Engine.

**CIRRUS AERO-ENGINES LTD.**

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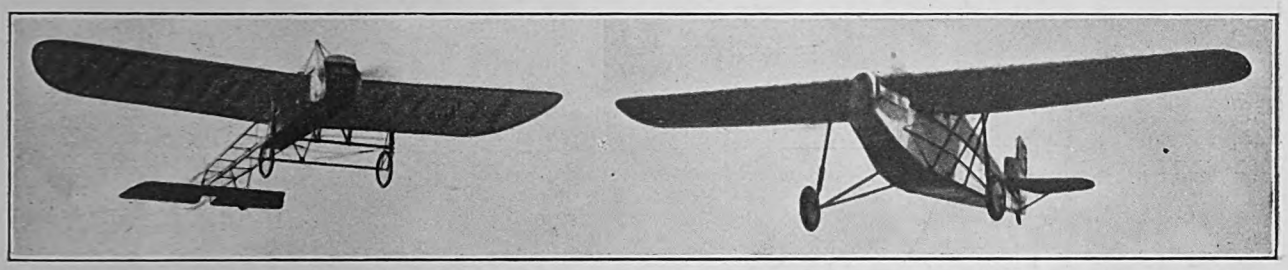
# THE DESOUTTER SUPPLEMENT.

## THE DESOUTTER AIRCRAFT COMPANY.



**THEN AND NOW.—On the left, Mr. Marcel Desoutter's Blériot monoplane on which he was a consistent performer at Hendon before the War, and on the right, the first Desoutter Mk. I monoplane flying at Croydon last year.**

The Desoutter Aircraft Co., Ltd., was formed in 1929 by Mr. Marcel Desoutter to construct light commercial aircraft of the cabin type. At the outset Mr. Desoutter acquired the licence to construct the Koolhoven FK.41 three-seat cabin monoplane which was originally fitted with the 95 h.p. Cirrus III engine.

The founder of the company is one of the pioneers of flying in this country. Mr. Desoutter took his flying certificate, which is No. 186 in the register of British aeroplane pilots, on a Bleriot monoplane at Hendon on Feb. 27, 1912.

Thereafter Mr. Desoutter flew quite a lot at Hendon on a Bleriot monoplane and was a regular performer at the week-end meetings which were such a popular feature at the old Hendon aerodrome before the War 1914-18. At about this time Mr. Desoutter had an accident which resulted in his losing a leg and thereafter he applied himself to designing an artificial leg of duralumin to replace the cumbersome wooden affair that was common in those days.

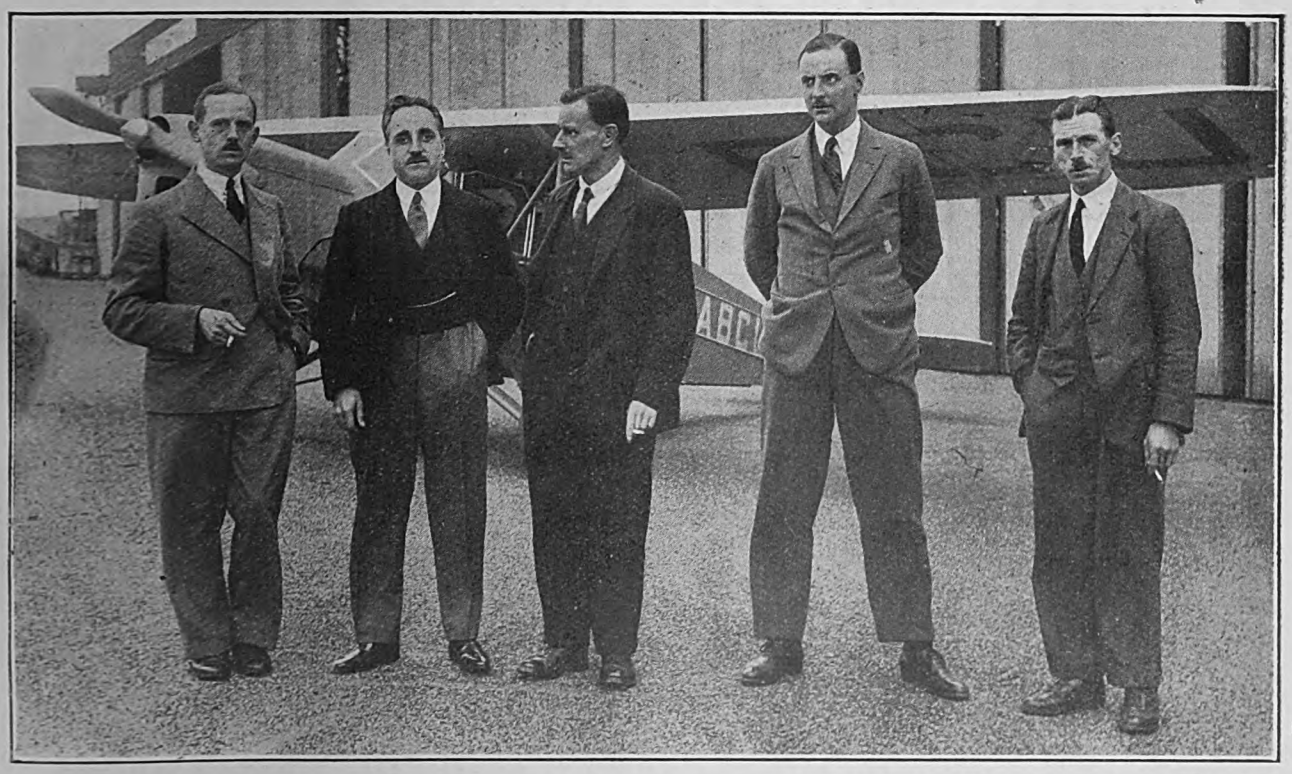
In collaboration with his brother, Mr. Charles Desoutter, he produced a satisfactory leg and during the war the brothers formed a company to manufacture it in large quantities. After much arguing with the Army Medical authorities towards the end of the war the firm of Desoutter Brothers, Ltd., was given a large contract for their duralumin legs to replace the American wooden legs which had been issued to the troops during the war.

Thus some years later, out of his own misfortune and the ill-fortune of thousands of others, Mr. Desoutter found himself in a sufficiently strong financial position to be able to return to aviation, and continue to do good work.

For some considerable time Mr. Desoutter examined the prospects of commercial aviation from all its aspects and he finally decided that what was wanted was a small cabin type machine which would be cheap to build, buy and operate, and one that would come between the popular two-seat light aeroplane and the bigger commercial machine of 250-350 h.p.

When he was convinced that there was a demand for such a type he arranged to take over, for construction in England, the Koolhoven FK.41 monoplane.

After receiving the designs, the Desoutter Company applied themselves to making certain modifications to facilitate quantity production and to do this work Mr. Desoutter engaged Mr. G. H. Handasyde, himself one of the pioneers of British aviation, as a partner in the famous Martinsyde firm, as Chief Engineer.



**THE FIRM.—From left to right: Mr. M. Langley (Chief Draughtsman), Mr. Marcel Desoutter, Mr. G. H. Handasyde, Mr. John Fox, and Mr. C. G. Barber (Works Manager).** —(*"Aeroplane" photograph.*)

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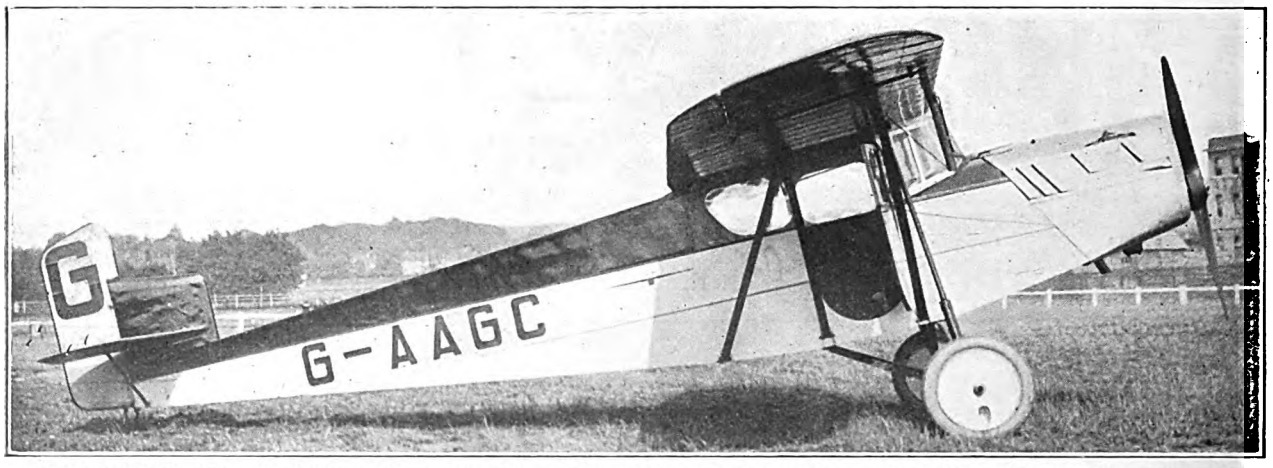


**THE FIRST.—The first Desoutter monoplane (Cirrus III engine) which was actually built in Holland by Mr. Koolhoven for the Desoutter Company.**—(*" Aeroplane " photograph.*)

Mr. Handasyde designed and built the first Martin and Handasyde monoplane in 1908 and from this early experiment was developed Martinsyde Ltd., a firm which during the war earned for itself a very high reputation for first-class workmanship and finish. Although the company built a large number of external designs, it did produce several original Martinsyde designs, notably the first Martinsyde Scout, the Elephant, and, right at the end of the war, the F.4, all of which were ordered in quantity by the R.F.C. and the R.A.F. For the design of all these machines Mr. Handasyde was responsible and the F.4, which was, unfortunately, ordered too late to allow it to go on active service, promised to be a worthy successor to the previous types of single-seat fighters which it was designed to replace. Only the fact that it was fitted with the French 300 h.p. Hispano-Suiza engine prevented it from going into service in the post-war R.A.F.

Mr. Desoutter acquired a portion of the Air Ministry sheds at Croydon aerodrome, alongside those of A.D.C. Aircraft, Ltd., and equipped them for quantity production in a modest way. The actual works are built within the big main shed, which is a steel structure, so that it was only necessary to erect a comparatively light wooden frame-building sufficient to define the works boundary and to make provision for adequate lighting and heating for the comfort of the workmen. It is therefore obvious that the works are extremely amenable to expansion with a minimum of trouble, expense and labour.

The entire works are piped for compressed-air tools and the latest type radiators and ventilating system have been installed.

The works got under way early in June, 1929, and one of the first Desoutter Mk. I monoplanes with the Cirrus III engine was exhibited at the International Aero Exhibition at Olympia in July, 1929, where it created a very favourable impression.

Immediately after the Exhibition the Desoutter Aircraft Co. put down a large batch of machines, a number of which had been ordered by National Flying Services for use as taxi and private hire machines, and the first production machine was delivered to N.F.S. in November, 1929.

Later in the year the 105-115 h.p. Cirrus Hermes engine was standardised for the machine as it was found that, although the Cirrus III engine gave ample power for flying under ideal conditions, the extra 20 h.p. provided by the Hermes was a desirable feature for an aeroplane which was expected to fly commercially under the varying conditions likely to be met at all seasons of the year.

Early in its life the Hermes-engined Desoutter monoplane was called upon to prove its qualities as an all-round touring machine when two New Zealand-born R.A.F. officers decided to spend their leave by flying to Australia. These two officers, Flg. Offs. Piper and Kaye, chose the Desoutter monoplane because of its comfort and the fact that it was of the cabin type. Their machine — G-AATI — was perfectly standard except that it was arranged as a two-seater and the space that would normally be occupied by the third seat was given over to additional petrol tanks. The two seats were so arranged that the back of the pilot's seat could be removed to allow the occupants of the machine to change places while in the air.

They left Croydon on Feb. 10 and flew into bad weather which hindered them all the way across south-west Europe to Naples. Strong head-winds forced them to land a few miles short of Lyon, their first stop after leaving Croydon, and the whole country was inundated by floods. From Lyon they flew to Avignon down the Rhône valley with practically no visibility and when they landed the wings and struts of their machine were covered with ice. From Avignon they flew over mountains in snow and it was not until they reached the Mediterranean coast that they flew into sunshine. Their next stop was at Pisa, and here the aerodrome was under water. From Pisa they continued to Naples and thence to Malta.

From Malta they flew to Benghazi over 412 miles of open sea, and from Benghazi they continued by way of Mersa Matruh and Tobruk to Port Said and Aboukir. All along the north coast of Africa they met head-winds and the stage from Mersa Matruh to Tobruk, which is a distance of only 220 miles, took them over four hours.

Between Gaza and Baghdad they had difficulty in fol-

**THE LATEST.—The most recent Desoutter Mk. II monoplane (D.H. Gipsy III engine) to leave the Desoutter Works. This machine is to be delivered to Miss Winifred Spooner this week.**—(*" Aeroplane " photograph.*)

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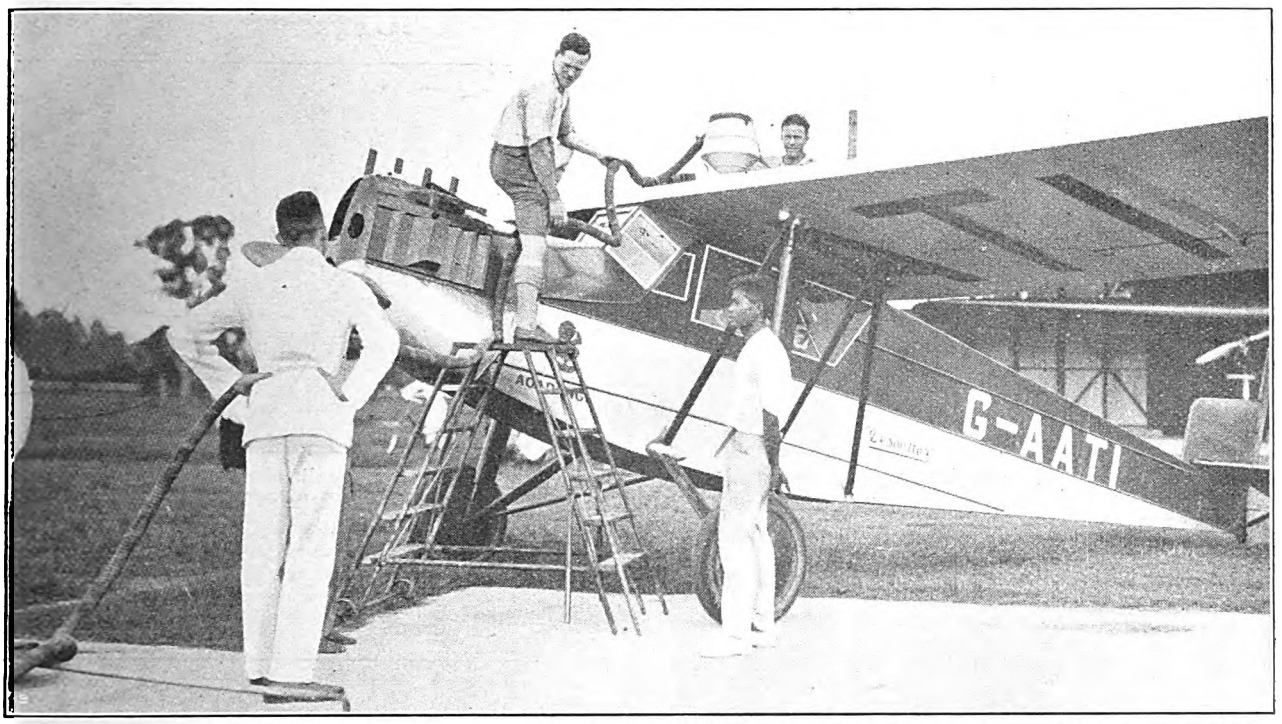


**IN THE DUTCH EAST INDIES.—Flg. Offs. Piper and Kaye filling up with Shell spirit at Darmo, Sourabaya, on Mar. 22, 1930, on their flight from England to Australia.**

lowing the ground track owing to low clouds and rain and on one occasion got completely lost which made it necessary for them to return to Aman. Between Baghdad and Karachi they were delayed two days with engine trouble.

Further bad weather was met between Karachi and Jodhpur which forced them to turn back but finally they got through to Calcutta over most difficult country composed mainly of mountains and jungle.

From Calcutta to Akyab they again flew over the sea in mist and fog and just short of Akyab they were forced to land on a small island. Here they were compelled to wait three weeks for spare engine parts. They eventually got away to Rangoon, where they landed on the race-course, and then on to Bangkok and Singora. At Singora they had to fill in a number of pot-holes in the aerodrome before they took off for Singapore. Over Sumatra they met the worst clouds and storms of the trip and shortly after leaving Bima, on the Island of Sumbawa, they were again forced to land, this time by rain and darkness. They managed to get down on a sandy beach and the machine tipped up on its nose but no damage whatever was done. Finally they got through to Darwin on Mar. 24, and continued thence across Australia to Sydney.

This was the first light cabin aeroplane to fly to Australia. It started from Croydon loaded to 2,000 lbs. instead of the normal 1,800 lbs., but in spite of this a cruising speed of 102 m.p.h. was obtained. After the conclusion of the flight the Desoutter Aircraft Co., Ltd., received the following cable from Flg. Off. Piper:—

Aircraft wonderful under all conditions.—Piper.

Although the route to Australia has been flown over quite a number of times, familiarity with the route does not lessen its admitted dangers. Atmospheric conditions over certain portions of the route are very severe, the country passed over does not allow for landings other than at recognised stopping places, and the wide variations in temperatures, ranging from extreme cold to tropical heat, constitute a very severe test for machine and engine.

That the Desoutter monoplane should come through such a gruelling test without any trouble whatsoever brands the machine as one that is capable of taking its place with the best of the World's light commercial aircraft.

Another notable flight in a Desoutter monoplane was that made by Mr. C. B. Wilson from Croydon to Baghdad and back, a distance of 5,500 miles, in 62 flying hours. Mr. Wilson operates the Press and General Air Services, a concern which lays itself out to attend to the requirements of the daily press in the carriage of photographs and copy, or even press photographers and reporters, to and from all parts of Europe, Asia and Africa at a moment's notice and with all possible speed. Mr. Wilson uses a Desoutter with a Cirrus Hermes engine, a combination which is giving him excellent service. On his Baghdad flight he reported no trouble whatsoever and a week after he had returned he flew the machine round the King's Cup course at full throttle.

In June, 1930, it was announced that the Desoutter Sports Coupé had been granted a new Certificate of Airworthiness for normal flying at an increased weight of 1,900 lbs. and it was also granted an Aerobatic Certificate of Airworthiness for a load of 1,550 lbs.

At about the same time the Desoutter Mk. II Sports Coupé made its appearance. This machine, which is described elsewhere, incorporates a number of modifications and improvements which have suggested themselves as the result of experience with the Mk. I type or as the result of the general trend of progress in air transport.

The sales of Desoutter aircraft in Great Britain and abroad have been very satisfactory and machines are in use in Great Britain, Canada, Australia, New Zealand, Irish Free State, Belgium, Hungary, the Argentine Republic, etc.

In a number of cases the Desoutter has been chosen for its suitability as a taxi machine, for its comfort, accessibility and cheapness of operation, but its advantages as a private-owner's machine are fully recognised, and several machines have been sold to individuals not only in Great Britain but also abroad.

## FOREIGN BUYERS OF DESOUTTER AIRCRAFT.

Dominion Air Lines, of Wellington, New Zealand, has ordered three Desoutter monoplanes for use on an air line which they are to operate between Wellington and Nelson.

The Aeronautical Corporation of Canada, Winnipeg, has bought a Desoutter monoplane. This company acts as agents for all kinds of aeronautical accessories and equipment and also represents one or two American aircraft constructors.

A Desoutter monoplane has been bought by the Hart Aircraft Service, of Essendon Aerodrome, Melbourne, Victoria, for use as a general taxi or private hire machine.

The Iona Engineering Works, of Glasnevin, Dublin, has bought a Desoutter Mk. II monoplane, which it will use for general taxi work throughout the Irish Free State.

Ferrand and Rayson, of Buenos Aires, Argentina, have acquired a Desoutter monoplane, which they will use in connection with their general air operations in the Argentine, particularly in connection with the transport of passengers between ranches and estancias up-country.

Count J. de Wenckheim, a Hungarian nobleman, has taken delivery of a Desoutter Mk. II monoplane through University Motors Ltd. This machine, which is perfectly standard, will be used by Count de Wenckheim for his own private use in Hungary.

The *Société Anonyme d'Exploitation et de Representation Aéronautique* ("*Aera*"), of Antwerp, are operating an air taxi service in Belgium with a fleet of Desoutter monoplanes.

The *Compagnie Internationale de l'Aviation Legère* ("Cidal") is to organise a taxi air service, and it is reported that this French company will use Desoutter monoplanes.

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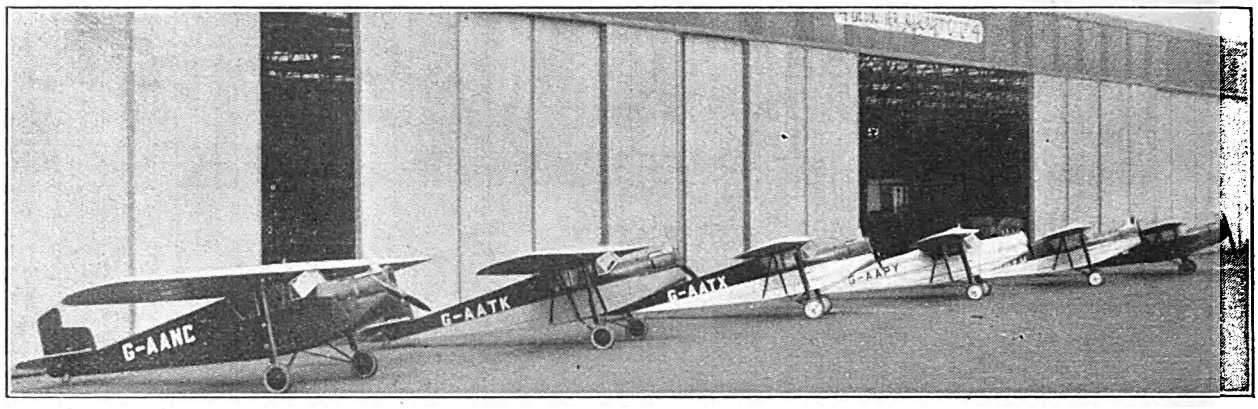
# THE DESOUTTER SPORTS COUPE.




**PRODUCTION.—A batch of Desoutter Mk. I cabin monoplanes (Hermes engines) standing outside the Desoutter Works at Croydon awaiting delivery to their various owners.**

The Desoutter Sports Coupé is a three-seat cabin monoplane which may be fitted with the Cirrus III, Cirrus Hermes upright or inverted, Gipsy II upright or Gipsy III inverted engines.

The upright engines are installed in the Mk. I model and the inverted engines in the Mk. II type.

Both the Mk. I and Mk. II types are very similar in general arrangement and construction but for descriptive purposes they will be treated separately.

### THE DESOUTTER MK. I MONOPLANE.

The Desoutter Mk. I three-seat cabin monoplane was the first and only machine of its type to be made in Great Britain.

The wing is built in one piece and is of the cantilever type. It is built up of two spruce box spars, which have laminated flanges and plywood sides, and the usual number of built-up spruce ribs. The wing covering is plywood, which is pinned to the spars and ribs in panels of suitable width, the joints of which are protected with glued tape.

The wing is supported above the fuselage by a system of steel tube bracing-struts which transmit all the loads to the bottom of the fuselage. There are three of these struts on each side of the fuselage. The front one runs from the front spar to the bottom fuselage longeron and the back two are in the form of an inverted Vee and run down from the rear spar also to the bottom longeron. The wing rests on the top of the fuselage, but it is only positioned there by two small angle plates and bolts, one on each side of the fuselage in the plane of the rear spar.

The fuselage is a rectangular wooden structure which has a spruce framework consisting of four longerons and ten transverse rigidly-braced bulkheads which are assembled by plywood gusset-plates. The whole structure is covered with plywood which is glued and pinned to the longerons and bulkheads. The outer skin is further reinforced by longitudinal external spruce stringers. All corners and joints in the plywood covering are protected with glued tape.

The tail unit is of the normal monoplane type. The tail-plane is built up like the wing with spindled spruce spars, spruce ribs and plywood covering. The rudder and elevators are steel framed and are covered with fabric. The tail-plane is only adjustable on the ground with a Vernier type adjustment, but the elevator control is provided with a spring-loaded adjustment.

The undercarriage is of the divided type. Each side of the undercarriage consists of a long vertical compression leg which incorporates rubber-in-compression springing. The top end of this leg is anchored to the front spar of the wing at the point where the front wing-bracing strut is attached. The bottom end is hinged to the bottom fuselage longeron by a steel tube axle and backwardly-inclined radius rod.

The 105/115 h.p. Cirrus-Hermes four-cylinder in-line vertical air-cooled engine is mounted on a welded steel-tube structure and it is completely cowled in with aluminium panels.

This cowling incorporates a very carefully-designed air-chute on the left side of the engine which ensures adequate cooling for the engine. The side of the chute hinges outwardly for access to the sparking-plugs on that side of the engine.

The petrol tank, which has a capacity for 20 gallons, is mounted between the spars in the centre of the wing over the fuselage and gives gravity feed to the engine. A fuel shut-off cock is conveniently placed on the right-hand side of the fireproof bulkhead and an emergency cock on the bottom of the tank is also within reach of the pilot.

The cabin seats three persons, with the pilot seated centrally in front and two passengers side by side behind. The two back seats provide plenty of room for two medium-sized people. The pilot's seat has a folding back which allows for ease of access to the seat. There is a large door on the right side of the cabin.

The front windscreen fills the gap between the wing and the forward deck of the fuselage. The middle panel of the windscreen folds down to enable the pilot to put his head out and so see over the tail before taking off. The two side

ON THE RANK.—Three of a number of Desoutter Mk. I monoplanes (Cirrus Hermes engines), which are used by National Flying Services for air taxi work, outside their shed at Hanworth. —(*"Aeroplane" photograph.*)

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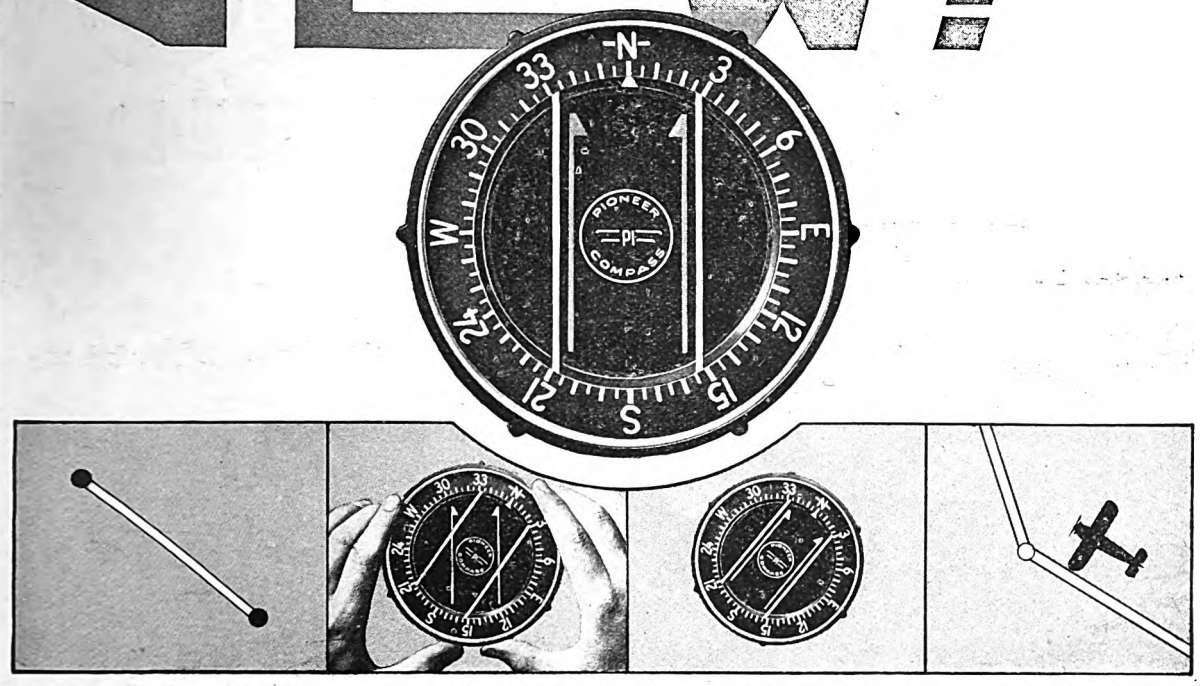
# NEW!

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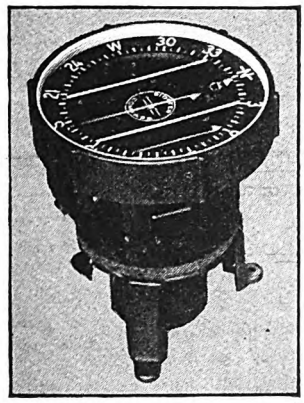
# Pioneer Straightway Compass

The Pioneer Straightway Compass embodies three distinct advantages.

This new Pioneer compass has practically no period. After the sharpest turn it resumes the correct reading with almost no over-swing or oscillation.

With the Pioneer Straightway Compass it is easy to navigate accurately. Merely set the compass circle to the desired heading. Then keep the two sets of lines parallel.

The Pioneer Straightway Compass has no parallax error. From any angle, at any time, you can check the correctness of heading at a glance.



*Available with vertical or horizontal mounting bracket*

The Pioneer Straightway Compass is made with the same precision as all other Pioneer instruments. It is immune to sudden or extreme changes in altitude or temperature.

The superior performance of the Pioneer Straightway Compass is obtained by reducing the weight of the magnetic element to a minimum, increasing the damping factor, yet retaining a strong magnetic control. Like all other Pioneer Compasses, it is equipped with the Titterington Micrometer Compensator and is completely radium illuminated. Write for full information.

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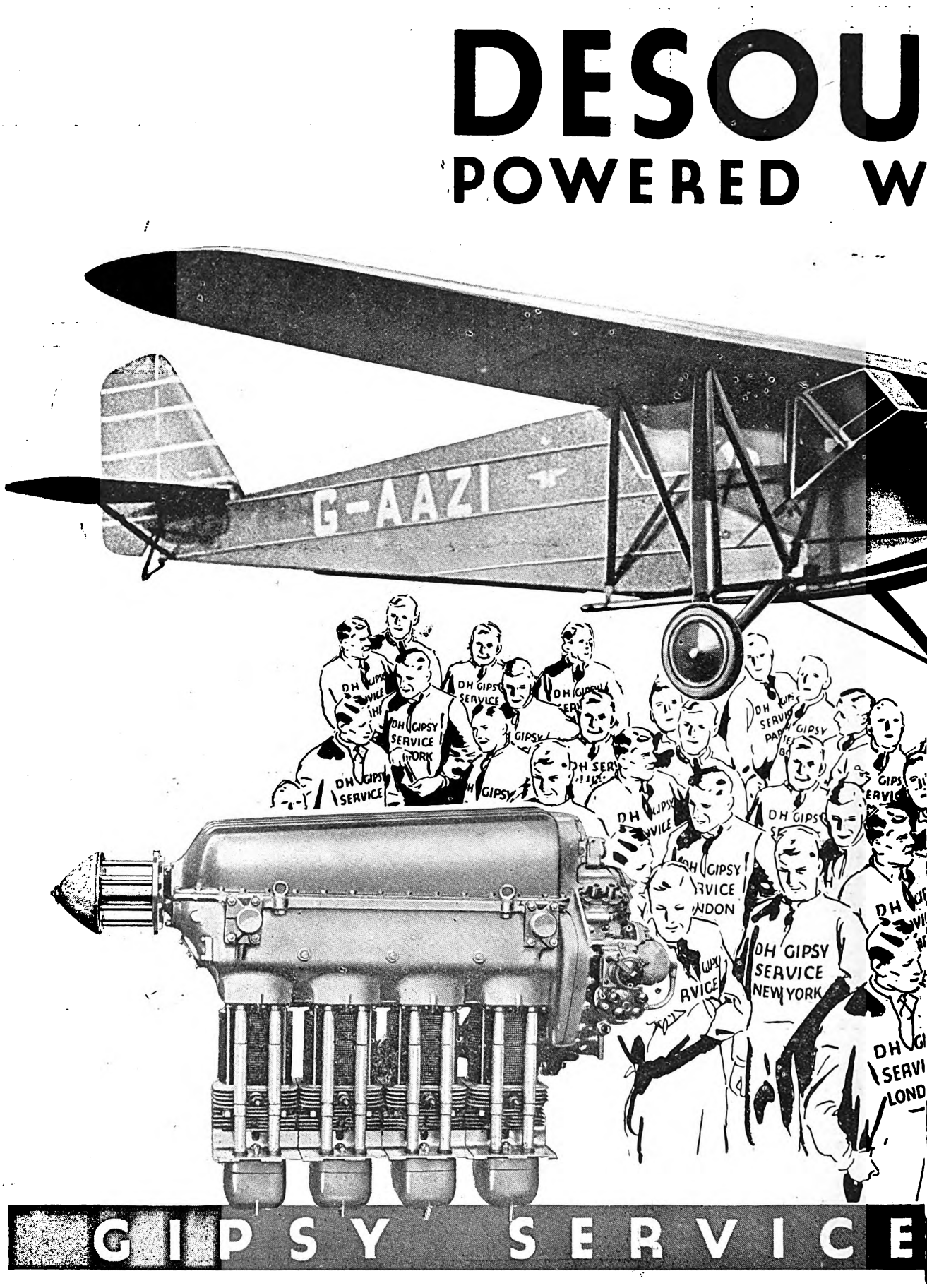




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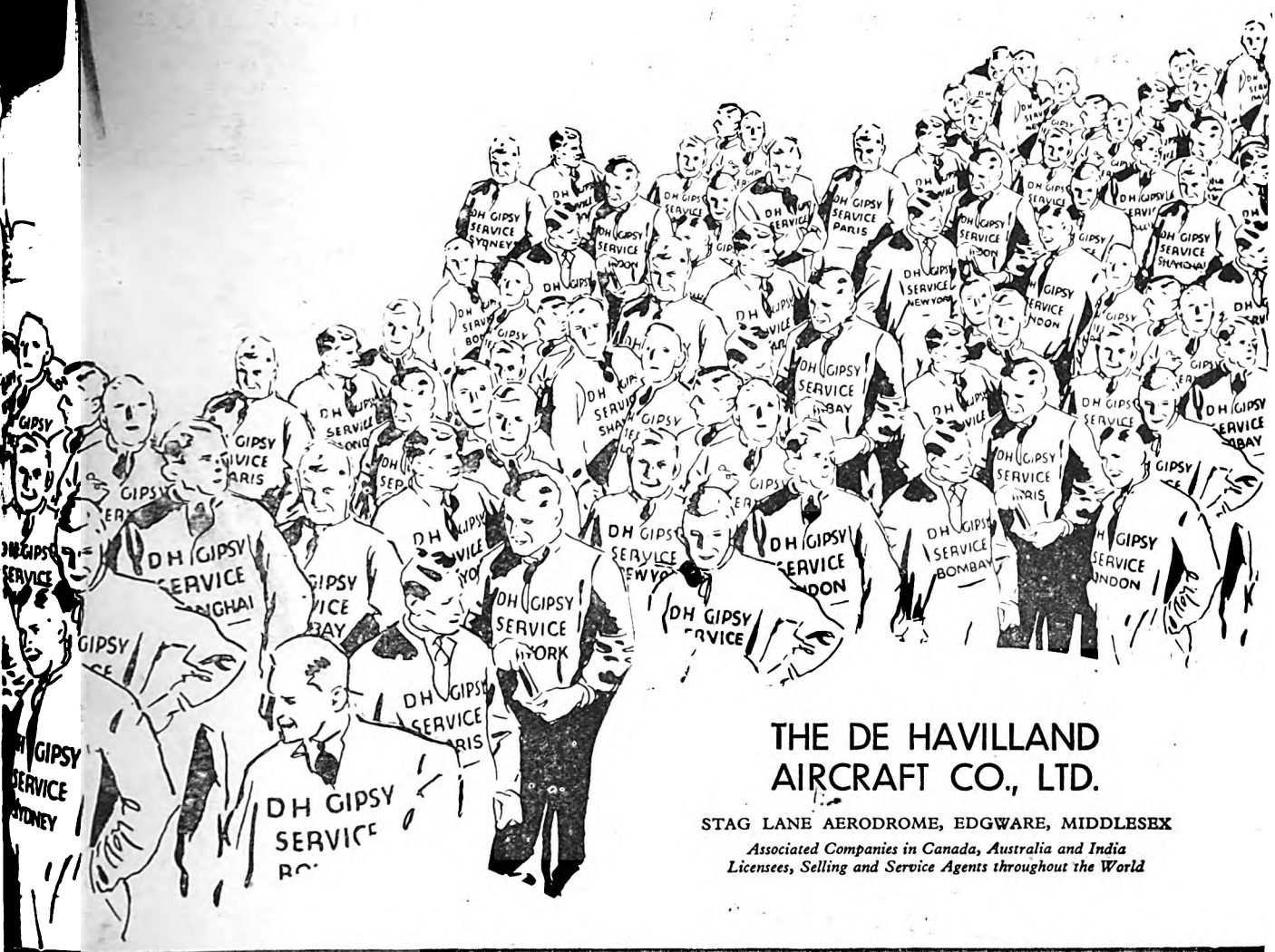
## THE DE HAVILLAND

## 120 H.P. GIPSY III

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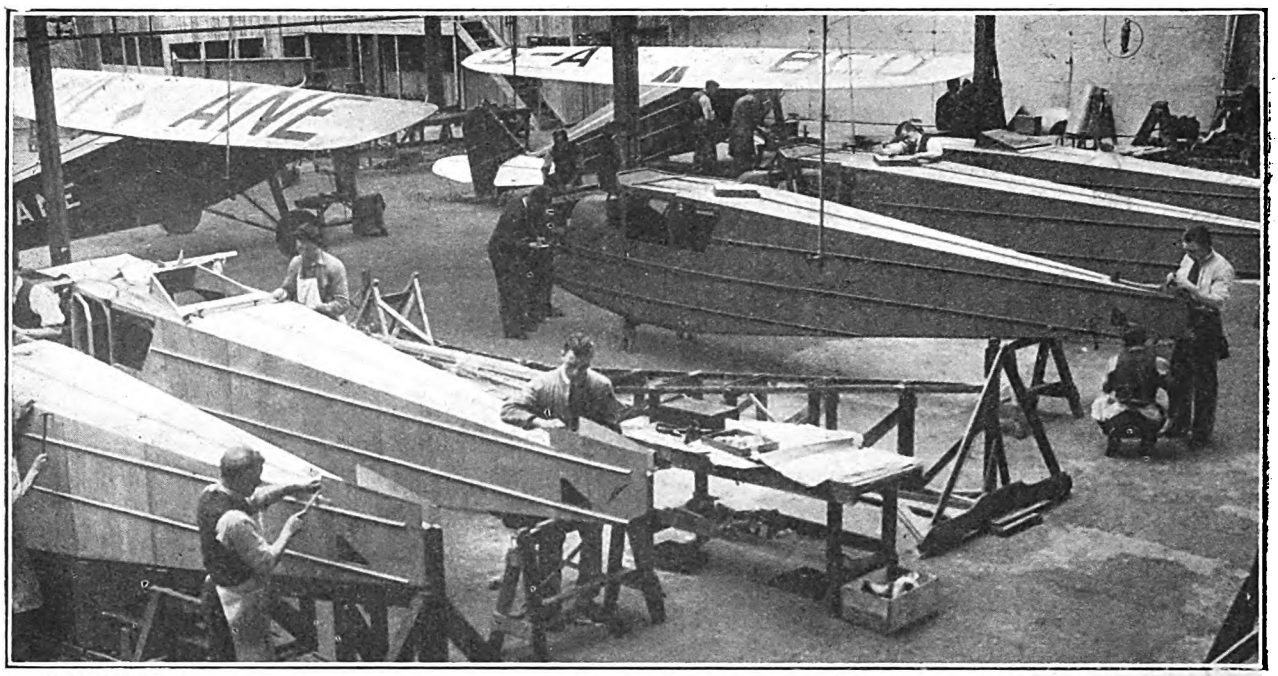


PRODUCTION.—Desoutter fuselages under construction. The two in the bottom left-hand corner are for Australia. The completed machine, G-ABCU, is the latest Mk. II model which has been bought by Miss **Winifred Spooner.**—(*"Aeroplane" photograph.*)

panels of the screen slide open for use in bad weather. The two windows beside the passengers open upwards and inwards and they may be locked in the open position by fittings on the roof of the cabin. In the roof aft of the rear spar there is a window which is so arranged that it can be opened from the inside and used as an emergency exit.

The interior of the cabin is very comfortably furnished and provides ample accommodation for its three occupants.

SPECIFICATION.

DIMENSIONS.—Span 36 ft. (11 m.), Length 27 ft. (8.2 m.), Height 7 ft. (2.15 m.), Chord 5 ft. 9 in. (1.75 m.), Wing area 190 sq. ft. (17.7 sq. m.).

WEIGHTS.—Weight empty 1,100 lbs. (500 kgs.), Disposable load 800 lbs. (363 kgs.), Weight loaded 1,900 lbs. (863 kgs.), Wing loading 100 lbs./sq. ft. (48.7 kgs./sq. m.), Power loading 16.5 lbs./h.p. (7.5 kgs./h.p.).

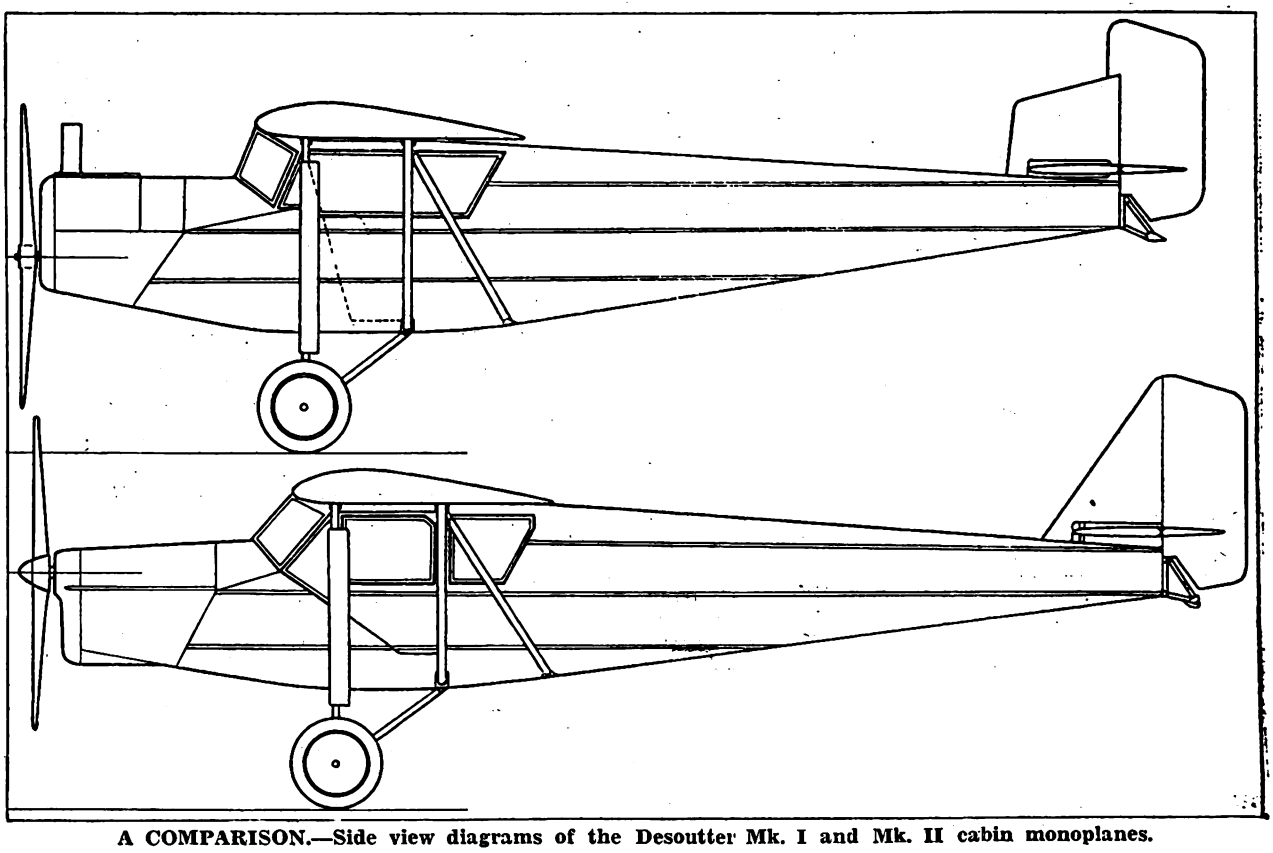
PERFORMANCE.—Speed, max., 111-115 m.p.h. (177.6-184 km.p.h.), Cruising speed 96-100 m.p.h. (153.6-160 km.p.h.), Landing speed 45-50 m.p.h. (72-80 km.p.h.), Climb to 1,000 ft. (305 m.) 1 min. 10 sec., Climb to 3,000 ft. (915 m.) 4 min. 15 sec., Climb to 5,000 ft. (1,525 m.) 7 min. 30 sec., Ceiling 16,000-18,000 ft. (4,880-5,490 m.), Range 400-500 miles (640-800 kms.).

## THE DESOUTTER MK. II MONOPLANE.

The Mark II Desoutter monoplane made its appearance in June, 1930, and this new type shows an all-round improvement over the Mark I type.

It is fitted with the 120 h.p. D.H. Gipsy III inverted engine, and this engine, apart from greatly improving the general appearance of the machine, gives a higher top speed without interfering with the slow landing and non-stalling qualities of the earlier model. The inverted engine allows for a perfectly clean and uninterrupted top line to the cowling and a narrower nose, both of which features give a better vision forward from the cabin. The raising of the thrust-line, another feature which is due to the inverted engine, gives an increased airscrew clearance and a lower undercarriage.

The cabin has also been improved. The lowering of the



**A COMPARISON.—Side view diagrams of the Desoutter Mk. I and Mk. II cabin monoplanes.**

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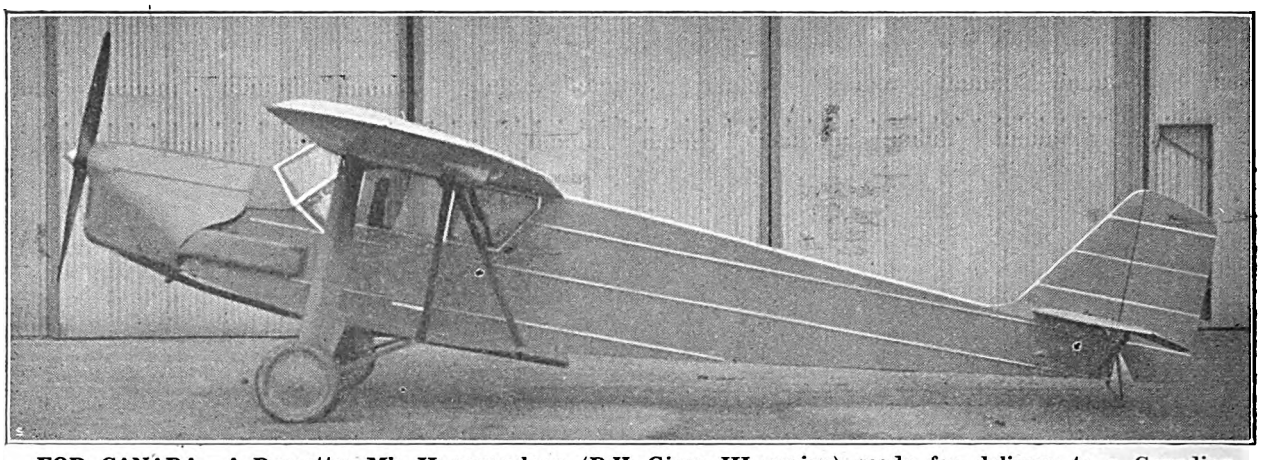

**FOR CANADA.—A Desoutter Mk. II monoplane (D.H. Gipsy III engine) ready for delivery to a Canadian buyer.**

undercarriage brings the cabin nearer the ground and with two doors, one on either side, direct access is provided to either of the passenger seats with the convenience equal to that of the modern saloon automobile. The forward vision as already mentioned, has been improved not only by the narrowing of the nose, but also by extending the pilot's side windows downwards and lower halves of these side windows are arranged to slide open for bad weather flying. The latest arrangement of the windows now assures that the front of the cabin is quite weatherproof. All the windows are bedded on strips of mousse-rubber which also eliminates rattle. The combined roof-light and emergency exit has been enlarged so that the pilot can see aft of the wing without moving from his seat.

The internal furnishing has been considerably improved. The lower halves of the cabin walls are covered with blue moquette cloth and the floor is covered with blue pile carpet.

The pilot's seat is now given a 2-inch fore-and-aft adjustment which, in conjunction with the adjustable pedals, allows for the accommodation of pilots of every variation of height and length of leg.

The two back seats are of the individual type and are upholstered in blue leather. Under these seats there is room for two suitcases, which are supplied as part of the equipment of the machine, and above and behind the seats there is an open luggage compartment.

A very complete set of instruments is supplied as standard. These include an air speed indicator, altimeter, engine revolution indicator, cross-level, petrol gauge, oil pressure gauge and compass. All control-leads from the front of the cabin are led away aft in a closed conduit along the floor of the cabin so that they cannot be interfered with by the occupants. Provision is made both inside and outside the cabin for inspection of the essential parts of the control system.

The wing and its method of mounting are the same as on the Mk. I model. Both ends of the wing struts are now protected by streamline fairings along the underside of the wing and the bottom of the fuselage respectively. A new type of mass-balanced aileron has been designed for the machine which gives very sweet and progressive lateral control.

**PRODUCTION.—Desoutter wings under construction in the Croydon works.**—(*"Aeroplane" photograph.*)

**FOR NEW ZEALAND.—A Desoutter Mk. II monoplane (D.H. Gipsy III engine) which has been delivered to Dominion Air Lines of Wellington, New Zealand.**

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For their successful flight from **England to Australia** on the **Desoutter Sports Coupe**

"Flight" Photograph.

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**A DESOUTTER FOR HUNGARY.—A Desoutter Mk. II monoplane (D.H. Gipsy III engine) which has been supplied to Count J. de Wenckheim, a Hungarian noble nan, by University Motors Ltd.**

The fuselage has been strengthened forward not because there was any structural weakness there, but to allow for the introduction of the two big doors and the new side windows which extend below the centre line of the fuselage.

The fuselage has been reduced in depth by 6 inches, but as the seats are placed lower in relation to the floor there is no difference in the head room for the seated passengers.

The tail-unit differs in outward appearance to the one fitted on the earlier model. The fin is now triangular and the rudder has had its balance removed. The construction of the whole unit is the same, that is, the tail plane is of wood and covered with plywood and the rudder and elevators are metal-framed and are covered with fabric. The tail plane is now of the adjustable type and the operating gear is fitted with a self-locking screw.

The undercarriage is similar to that fitted to the Mk. I except that it has been lowered by four inches. Palmer wheels are fitted as standard and the Palmer wheel brakes may be supplied as an extra.

The new engine-mounting is of the simplest possible type and consists of two triangular side frames which are braced centrally by one diagonal tube. The engine feet are carried in the Andre patent "Silentbloc" shock-absorbers, which are illustrated and described elsewhere. The engine, which is normally very sweet-running, is thus completely isolated from the rest of the structure and vibration in the machine is conspicuous by its absence.

The standard fuel tank, which is mounted in the wing over the fuselage, has a capacity of 25 gallons, or sufficient for a cruising range of 4½ hours. A larger tank to hold 33 gallons may be supplied. The oil tank is mounted externally low down on the left side of the fuselage so that oil from the engine sump drains into it by gravity. This position also assures that the oil is adequately cooled by the slip-stream.

The controls are very simple and straightforward and are of a type that require the minimum of attention in maintenance.

The rudder is operated by an adjustable rudder bar and the operating cables pass directly aft through a conduit along the floor of the cabin. The fore-and-aft movement of the control-column operates the elevators through a push-pull rod which also runs through the aforementioned conduit to a double-ended lever aft of the cabin. From this lever straight cables run to another lever under the leading-edge of the tail-plane and from here a straight tube runs to the control-lever on the centre-line of the elevator spar and within the fin. The sideways movement of the control column operates the ailerons through a lever at the side of the cabin, a vertical push-pull rod to another lever on the front wing spar and a continuous cable running along the spar and over sprockets and pulleys at points directly in front of the ailerons levers.

Provision is made for the installation of dual control should it be required.

At all necessary points throughout the control system inspection doors are provided and where necessary Tecalemit greasing nipples are fitted.

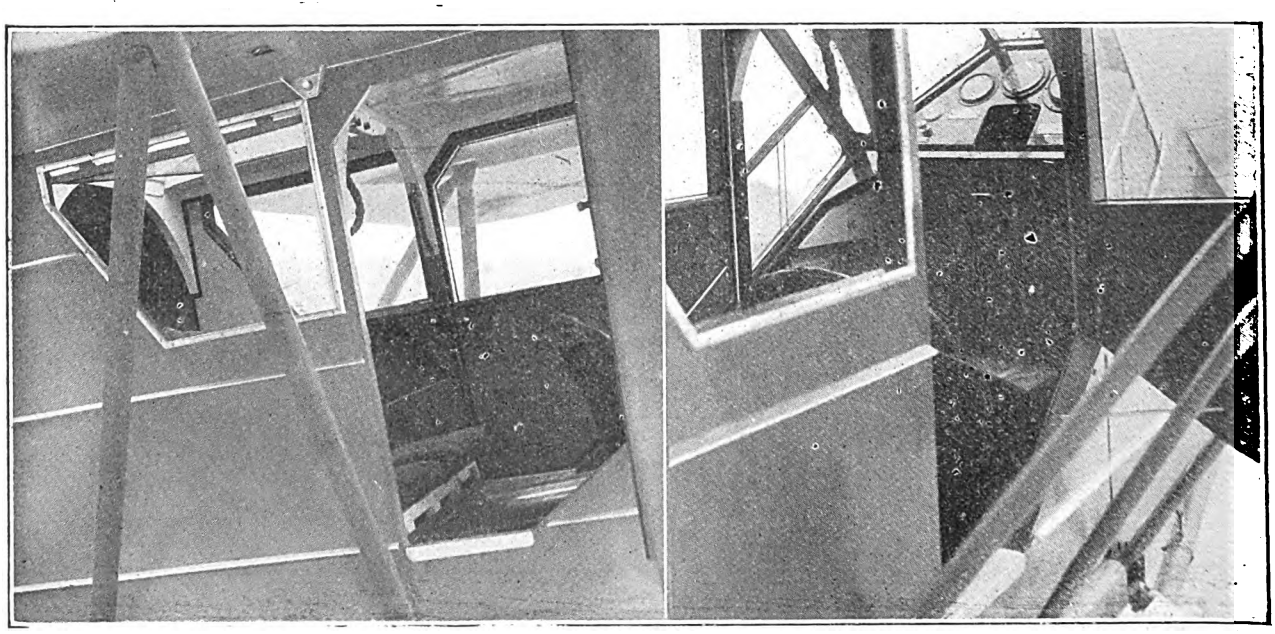
There is no doubt that every possible effort has been made to make the Desoutter Mk. II monoplane a worthy successor to the earlier model. The price complete with Certificates of Airworthiness and Registration at £985 compares favourably with that of any other machine of a similar type throughout the World.

SPECIFICATION.

DIMENSIONS.—Span 35 ft. 8½ in. (10.9 m.), Length 26 ft. (7.9 m.), Height 7 ft. (2.15 m.). Wing area 183 sq. ft. (17 sq. m.).

WEIGHTS AND LOADINGS.—Weight empty 1,180 lbs. (536 kgs.), Disposable load 720 lbs. (327 kgs.), Weight loaded 1,900 lbs. (863 kgs.), Weight loaded (Aerobatic C. of A.) 1,550 lbs. (704 kgs.). Wing loading 10.4 lbs./sq. ft. (50.7 kgs./sq. m.), Power loading 15.8 lbs./h.p. (7.2 kgs./h.p.).

PERFORMANCE.—Speed, max., 125 m.p.h. (164 km.p.h.). Landing speed 45-50 m.p.h. (72-80 km.p.h.). Climb to 1,000 ft. (305 m.) 1 min., Ceiling 17,000-20,000 ft. (5,185-6,100 m.), Range 5 hours or 500 miles (800 kms.).



**THE ACCOMMODATION.—Two views of the cabin of the latest Mk. II monoplane which is to be delivered to Miss Spooner. These views show the latest arrangement of the windows.**—(*"Aeroplane" photographs.*)

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# FLYING TESTS OF MODERN LIGHT AIRCRAFT.—V.

## THE DESOUTTER MK. II SPORTS COUPE.

BY FLT. LT. CHRISTOPHER CLARKSON.

**THE NEW DESOUTTER MONOPLANE.—The first Desoutter Mk. II monoplane (D.H. Gipsy engine) which is now used as a demonstration machine by the Desoutter Aircraft Co. Ltd.**—(*"Aeroplane" photograph.*)

The Desoutter Mark II made its first official appearance in the King's Cup Race of this year. Anyone who took the trouble to follow its times between the various controls must have realised that it was a considerably faster machine than its predecessor.

Not only has the performance been increased, but the appearance of the whole machine has been altered and improved by the installation of an inverted engine.

Minor alterations and improvements have been made to the interior of the cabin, and the new engine has allowed an increased window space in front of the pilot.

Mass-balanced ailerons are now fitted, and as it was found structurally impossible to do this in the usual way by having the hinges set back behind the leading edge of the aileron, the operating king-posts have been made horn-shaped and have been weighted at their ends so that they counterbalance the weight of the aileron. The idea is ingenious and works very well in practice and the aileron control is now particularly good.

The following figures were obtained with a D.H. Gipsy III engine, and carrying pilot and one passenger.

The take off was good. The machine comes "un-stuck" quickly, and it can be put into a climb almost at once. 1,000 ft. was reached in the first minute, 1,900 ft. in two minutes, and 3,600 ft. in five minutes.

It is very seldom that one has the time or the opportunity to test machines over a ground speed course, and in consequence one has to rely on the indicators for such results as one can get. A two-minute talk with any designer, or a moment's reflection on the queer places in which air-speed pitot-heads are placed, should convince anybody that not more than one A.S.I. in five can possibly register correctly, and one believes that in most cases it generally under-registers, at any rate at high speeds.

The speeds shown were very unsatisfactory, and one feels sure that the makers' claimed speeds of 125 m.p.h. full out, with a touring speed of 105 m.p.h., are much nearer the correct mark.

The controls, fore and aft, directional and lateral, are very good throughout the flying range of the machine. They are satisfactorily balanced in their relation to one another and they are all progressive in feel as the speed increases. The lateral control on this machine is as nice as any civil machine which one has flown. Mass-balanced ailerons are always nice to handle and there is always a pleasant absence of "snatch" about them. Furthermore, on this machine they are quite light without losing their feel and are very progressive as the higher speeds are reached.

In the stall the lateral control remains the last of the three to be effective and only disappears when the machine is quite stalled.

The actual stall itself is gentle and a stall on either a normal or a climbing turn does not appear to produce any violent reaction.

Under extreme provocation the machine will drop a wing, but control can be regained quite easily without the loss of much height.

The glide is moderately flat. The machine handles well during the approach and sideslips very nicely, answering to the controls immediately.

The tail-incidence gear makes the landing very easy indeed and the tail can be got down before the wheels. The run after landing was fair, and quite good enough for landings to be made in fields and small private aerodromes. But wheel brakes should be fitted. A good point was the quietness of the undercarriage on landing.

The machine taxies fairly well, and here again wheel brakes would be useful.

The comfort of the machine is very good. The pilot's seat, which is adjustable, is very well placed and the controls are all to hand. The instruments are well placed and very easy to see.

The passengers' seats are good. To be able to sit side by side is a great advantage and the upholstery and cushions and general "roominess" of the interior are satisfactory. It is possible to convert the machine into a two-seater with dual control in a very short space of time. Certainly the most exacting passengers should not be able to complain of lack of attention to their bodily comforts.

The noise is much the same as in any cabin machine yet tested, for one has not yet flown a cabin machine where this objection has not existed. The engine is not the chief cause, as very little machanical noise comes through to the cabin from the inverted power unit with its long exhaust pipes. The airscrew and the continual drumming of the slipstream around the windows and the rectangular fuselage appear to be the chief troubles, and so far no one has overcome them at all satisfactorily. The Desoutter is as good as any other machine, but the trouble is too obvious on all of them.

The lack of vibration was very noticeable, and the new André rubber "Silentbloc" mounting is very satisfactory.

The question of windows has been attacked, and as far as the passengers are concerned a most satisfactory solution has been arrived at.

Two large windows on each side of the back seats are made to open inwards and upwards, and are secured by a sliding bolt to the roof. Not much draught is created with either one, or both, windows open.

There are also two sliding windows, one on each side of the pilot's seat, but these are rather low down, and are too small.

Under extremely adverse weather conditions these would not be big enough, nor would they give a view far enough ahead for safe flying.

One would like to see one of the large front windows made into an emergency window, and fitted with a water-tight sealing strip which could be removed by the pilot, and the window opened, in the event of bad weather.

The view is quite good for a cabin machine, but the construction of the wing prevents the entire roof from being given up to a window. A "skylight" has been made between the rear spar and the trailing-edge, and it would be an improvement to have a corresponding one between the front spar and the leading edge.

The only items which struck one as leaving room for obvious improvement were the addition of wheel brakes, which are only optional equipment, and an extra allowance of movable window space for the pilot—so that he could open them in the event of really bad weather.

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AS USED IN THE DESOUTTER AIRCRAFT

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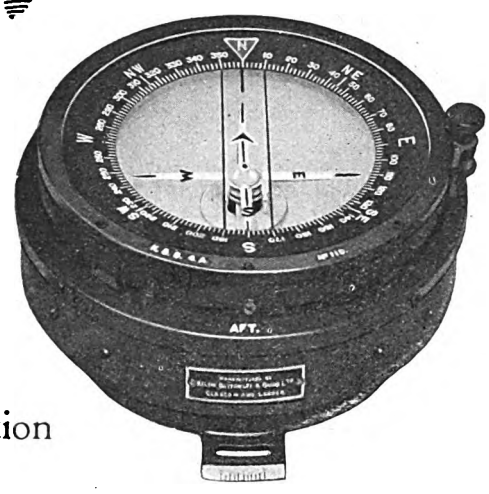

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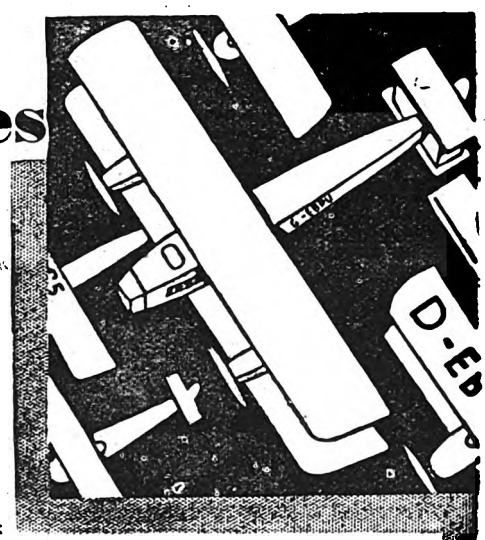

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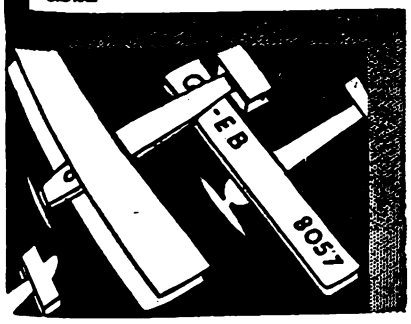

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# THE D.H. GIPSY III ENGINE.

The power-plant of the latest version of the Desoutter monoplane is the D.H. Gipsy III inverted four-cylinder-in-line air-cooled engine.

This engine has already been described in THE AEROPLANE for April 2, 1930, and the construction of the Gipsy engine was described in THE AEROPLANE for May 21, 1930. Its achievements since its introduction early this year are sufficiently well-known to make it unnecessary to repeat them here.

This engine is made in a modern factory at Stag Lane where the most up-to-date methods of production are practised. As an example of the methods adopted it is proposed to give a brief outline of the assembly and test of a standard Gipsy engine.

For each engine a complete set of parts is drawn from stores. This set is divided into a number of separate assemblies, each of which is completed before the main assembly is begun.

In the case of the crank-case all studs are fitted, the main bearings placed in their housing and the bearing caps bolted down. The crank-case is then set in a jig and the bearings are bored out slightly undersize. The finishing cut is taken by a reamer which leaves the bearings the correct size and fully polished. The cam-shaft bearings are next fitted and reamed to size. The crank-case is then trimmed up and all burrs and sharp edges removed. The main bearings and caps are then removed, the crank-case is washed and all oil ways are blown clean by an air jet.

The crank-shaft is first washed and then the gear wheel is fitted to the rear end of the shaft and all oil seals are fitted and split-pinned.

The connecting rods have the big-end bearings fitted in their housings, after which they are bored and reamed to size on a special fixture.

The pistons have their rings and the gudgeon-pin fitted.

The cylinder-heads have all studs, the rocker brackets and valve gear covers fitted. The valves are then ground in and the head is washed before the valves are finally fitted.

The above are some of the more important sub-assemblies, but all parts are assembled first in separate units wherever possible and placed in their respective bays in the correct order for the main assembly.

The main assembly is done by a line of operators, each of whom has a special part or assembly of parts to fit and the gradually growing engine is moved along the line as each operation is completed. A special engine-stand fitted with wheels is used. This stand is so constructed that the engine can be placed in any position without the necessity of removing it from the stand.

An inspection chart is hung on the stand and each operation is checked and passed by an inspector before the next operation is begun.

On completion of the main assembly the engine is bolted on a running-in stand, the oil system is connected up and a pulley is fitted to the airscrew boss. A belt from overhead shafting is passed over the pulley and the engine is run in for two hours.

The engine is then taken to the test-house by a motor truck and is fitted up for an endurance test with a calibrated airscrew. It is run for a further two hours at 9/10ths full throttle and then for five minutes at full throttle.

The engine is then taken to the stripping shop, where it is completely dismantled. All parts are cleaned and put through a washing machine. This machine is electrically-operated and has a moving track. The complete set of parts are placed on this track and are passed through the washing chamber, where they are submitted to two powerful jets of hot water. After washing each part is inspected and once again the engine is assembled ready for final test.

The engine is then placed on a Heenan and Froude test bed and the engine is run for half an hour at 9/10ths full power, after which power and throttle curves are taken and petrol and oil consumption, oil pressure and temperature are checked. After these tests the engine is prepared for despatch by having dummy sparking plugs substituted for the real plugs and all oil connections blanked off.

A final inspection is then made before the engine leaves the shops for despatch to the aircraft manufacturer.

Although the foregoing description is necessarily brief, sufficient can be gained from it to show the intricate care which is taken to ensure absolute efficiency of the completed engine.

Throughout the process of manufacture a series of inspections is made to guarantee that all material is sound and that all machining is correctly done. Jigs are used wherever possible to ensure that all parts and assemblies are accurate and interchangeable.

The brilliant record of the Gipsy I, the forerunner of the Gipsy II and Gipsy III, is sufficient guarantee that the De Havilland manufacturing methods are fully justified.

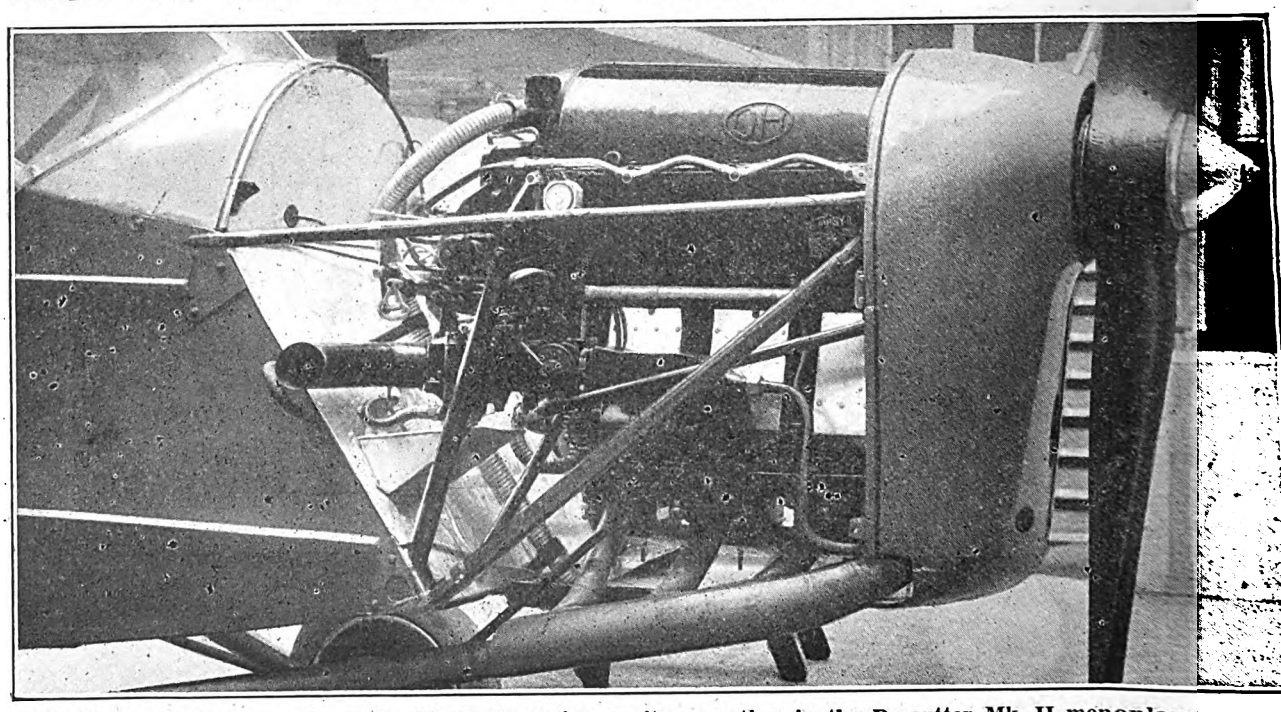
The Gipsy III engine is comparatively new, but the remarkable non-stop flights from London to Malta and back and from London to Tangiers and back made recently by Mr. C. D. Barnard are alone sufficient to allow one to foresee for the engine a brilliant future.

## A USEFUL PETROL GAUGE.

A pilot must be able to tell with reasonable accuracy the amount of fuel he has in his tanks when flying so that there shall be no chance of a fuel shortage forcing a landing. Naturally the Desoutter Aircraft Co. Ltd. take the necessary steps to enable a pilot of their Sports Coupé to see how much fuel he has at any moment, and the gauge they use for this purpose is one supplied by Nivex Gauge Ltd., of Ardwick, Manchester.

This gauge is well-known and one sees examples of it on many different makes of cars. A small pump on the dashboard, the gauge, two pipes to the tank and one vertical pipe inside the tank comprise the whole system. A great feature of the Nivex system is that no fuel is drawn into the pipes. The risk of fire or leakage does not therefore arise from the use of one of these gauges.

To read the gauge the plunger is pulled out and the hand of the gauge immediately registers on the dial the number of gallons in the tank.



THE POWER-PLANT.—The D.H. Gipsy III engine on its mounting in the Desoutter Mk. II monoplane.
—("Aeroplane" photograph.)

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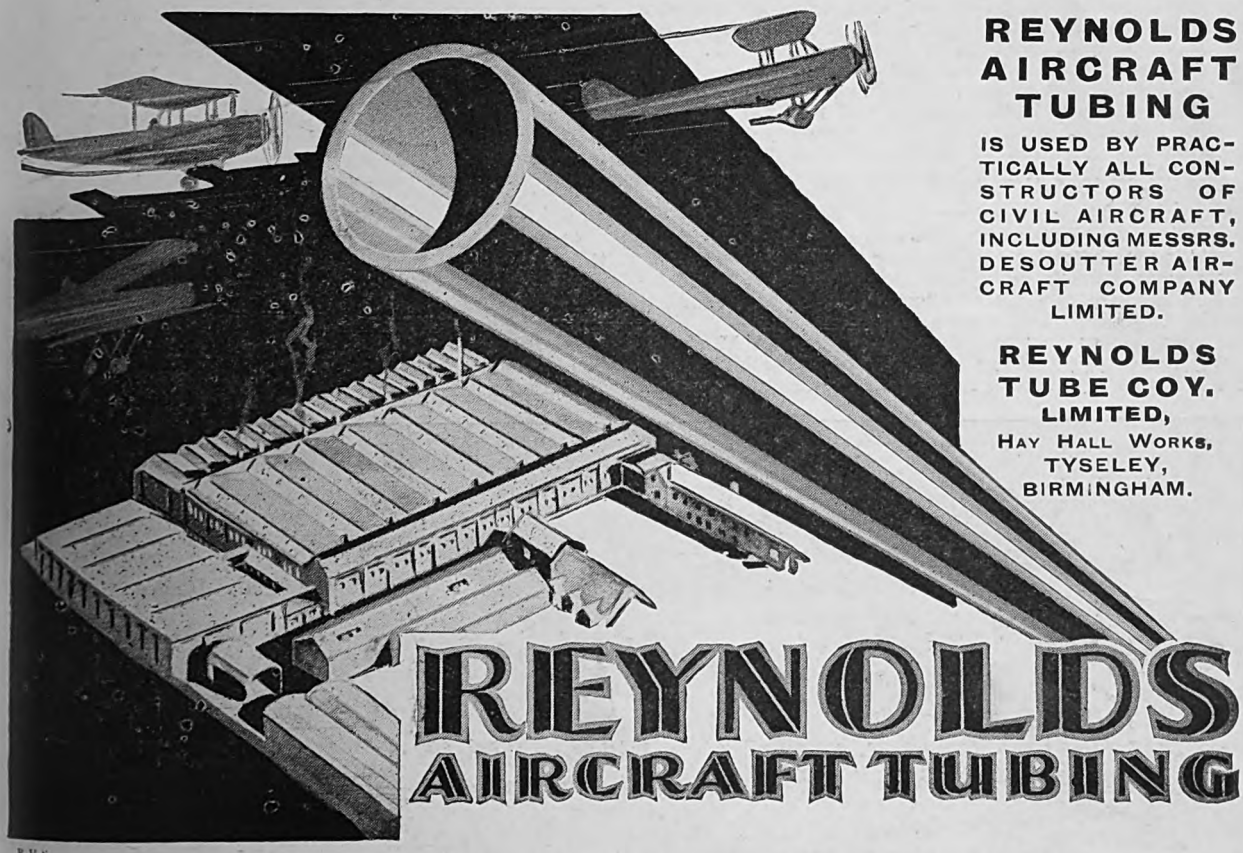


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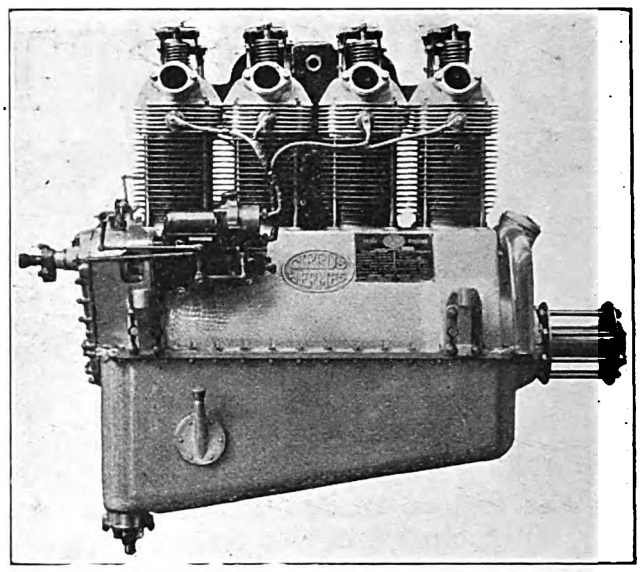
# THE CIRRUS HERMES ENGINE.

The 105/115 h.p. Cirrus Hermes engine was produced by Cirrus Aero-Engines Ltd., to meet the demand for an engine of slightly higher power than that generated by the Cirrus II and Cirrus III engines.

These earlier Cirrus engines, as has so often been quoted, made the light aeroplane movement possible througout the British Empire, but the success of the light aeroplane as a light and economical training or touring machine merely preluded its entry into the more serious commercial field. Light aeroplanes were called upon to operate in all climates, and in many cases as seaplanes, and this increase in the sphere of operations of this type of aircraft resulted in an almost inevitable demand for a quicker take-off, a bigger useful load or a bigger range.

Cirrus Aero-Engines Ltd., with the accumulated knowledge and experience gained with the lower-powered Cirrus engines, produced the 105/115 h.p. Cirrus Hermes engine to fill this demand, and this engine followed the precedent set by the Cirrus Mk. I, Mk. II and Mk. III engines and passed the Air Ministry Type Test at its first attempt.



**The 105-115 h.p. Cirrus Hermes Mk. II engine.**

### THE CIRRUS HERMES MK. II ENGINE.

The Hermes engine in its original form has already been described more than once in THE AEROPLANE, but it has now been modified in several minor ways and the engine so modified is known as the Cirrus Hermes Mk. II. All Hermes engines now produced are of the Mk. II type, and several of the Mk. I engines which have been in use for some time have been modified to bring them in line with the latest model.

The cylinders are now supplied with fins of equal depth all round the barrel instead of with the concentric type fins as it was found that the older type did not give equal dissipation of heat and that the extra metal between the cylinders, where it was thought that irregular cooling might occur, was not necessary.

The pistons are of the type fitted to the Cirrus III, that is, they have an equal depth of skirt all round, and do not have the inset flats in the region of the gudgeon-pin bosses. Two compression rings and one stepped scraper ring are now carried above the gudgeon pin.

The cam-shaft has been redesigned with cams of less severe profile.

Additional oiling of the connecting-rod bearings is provided by 1-32 in. holes which have been drilled in the crank-shaft webs. Special baffles are inserted in the big-ends to prevent the possibility of dirt getting in through these holes.

The valves have been redesigned with a less acute radius to the tulip head to give a bigger body of metal at a point where fracture is likely to occur.

The bottom of the crank-case has been finned to aid the cooling of the oil in the sump. In some engines an electron metal crank-case has been supplied, and this has shown a saving in weight of about 8 lbs. The company feels, however, that the retention of the older aluminium crank-case is justified until it has had more experience with the lighter metal.

The Zenith 48D. carburetter is now fitted as standard. This carburetter has an altitude compensator incorporated and this is now officially approved for the Hermes engine.

The engine controls have been redesigned with the magneto and throttle controls interlocked. A separate control is provided for the altitude compensator.

The specification and performance of the Mk. II engine are identical to those of the Mk. I engine. The Mk. II engine merely incorporates a number of modifications which have been designed to enhance the reliability and all-round efficiency of this well-known engine.

### THE INVERTED CIRRUS HERMES ENGINE.

In accordance with their policy of meeting the requirements of the latest trends in the design of light aircraft Cirrus Aero-Engines Ltd. has introduced an inverted version of the Hermes engine.

The first inverted engine has now run something between 300 and 400 hours both on the test-bed and in the air, and has successfully passed the Air Ministry Type Test.

In producing this engine Mr. A. H. Capel, the chief designer of the company, has borne in mind the importance of interchangeability, and the result is that the upright and inverted Hermes engines have an uncommonly large number of parts which are applicable to both engines.

Apart from the design of the crank-case and the induction system the principal parts, which include the cylinders, cylinder heads, crank-shaft and its bearings, the cam-shaft and its bearings, connecting-rods, valve-gear, timing-gear and magnetos, are interchangeable with the upright engine.

The lower half of the new crank-case houses the main crank-shaft and cam-shaft bearings, and the timing-gears are carried at the rear end as in the upright engine.

The cylinders protrude into the crank-case, and each cylinder has a spigot turned on the skirt which beds against a rubber ring, and is held in place by the long holding-down bolts. Baffles of cast aluminium are held in place round the cylinder skirts by the top ends of the holding-down bolts.

As the engine is of the dry sump type there are three holes in the bottom of the bottom half of the crank-case which connect with an outside oil gallery leading to a scavenger pump at the rear end of the casing and thence to the oil tank which is carried on the aeroplane. A scavenger pump is fitted to allow the aeroplane designer a certain amount of freedom in his placing of the oil tank.

Although the bottom half of the crank-case is specially

**HERMES-ENGINED.—A Desoutter Mk. I monoplane (Cirrus Hermes engine) which is the property of Cirrus Aero-Engines Ltd.**

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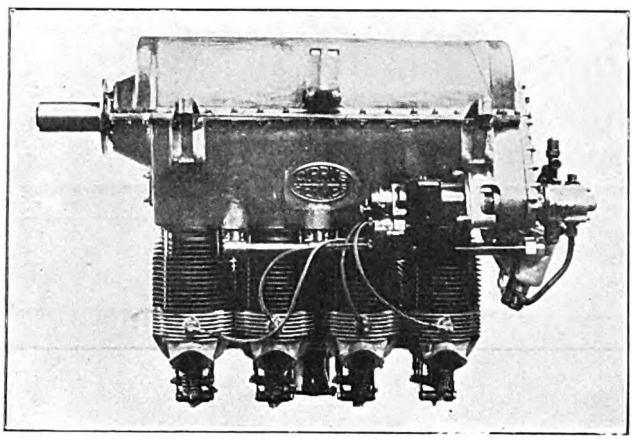
**HERMES-ENGINED.—The Desoutter Mk. I monoplane, belonging to Cirrus Aero-Engines Ltd., in which has been installed the first inverted Cirrus Hermes engine.**

designed for the inverted engine, by the removal of the detachable baffles and by blanking off the oil holes, it may also be used for the upright engine. The top half of the crankcase merely acts as a cover for the moving parts.

The first of the new engines is installed in the Desoutter Mk. I monoplane which is the property of Cirrus Aero-Engines Ltd., in which machine it has done all its flying tests.



**The 105-115 h.p. inverted Cirrus Hermes engine.**

The cowling as at present fitted is very similar to that used for the upright Hermes engine. As with the upright engine, the inverted engine will be supplied complete with the standard cooling ducts so that aircraft designers will only have to cut such openings in the cowling as will coincide with these ducts.

The advantages of an inverted engine are already fully recognised. An improved forward view, a higher airscrew thrust-line, and cleaner cowling, are all of sufficient importance to merit the production of this type of engine. That the Cirrus Company should produce such an engine which incorporates so many features which are interchangeable with its already well-tried upright Hermes engine should guarantee for it an excellent future.

Hereafter follows a specification of the inverted Hermes engine. This specification is almost identical with that of the standard upright engine but where the figures for the latter engine are different they are given in brackets.

Bore and Stroke: 114x140 m/m.
Cubic capacity: 5,717 c.c.
Normal b.h.p.: 105 at 1,900 r.p.m.
Maximum b.h.p.: 115 at 2,100 r.p.m.
Compression ratio: 5.1:1.
Weight: 290 lbs. (310 *lbs.*).
Petrol consumption: 0.58 pints per h.p. hr.
Oil consumption: 1 pint per hour.
Length overall: 1.077 m/m. (978 *m/m.*).
Height overall: 739 m/m. (916 *m/m.*).
Width between engine bearer bolt centres: 478 m/m. (482 *m/m.*).

## ACCESSORIES AFTER THE FACT.

### AIRCRAFT FINISHES.

The finishing process on the wings and fuselage of the Desoutter monoplane is a "Belco" cellulose process in the 293 line, which is a special flexible type of nitro-cellulose material for application to wood or wood and metal surfaces, supplied by Nobel Chemical Finishes Ltd., of Slough, Bucks.

The actual process is a seven-coat one and involves two coats of primer, two coats of wood filler and three coats of "Belco" 293 in the appropriate shade. The "Belco" material is the same type as is used for the finishing of automobile bodies by the principal automobile manufacturers and motor-body builders in this country.

The whole of the materials involved in the above process are applied by spraying, but the primer and wood filler may be brushed on if necessary.

With regard to the adhesion of sealing strips, this is done by using "Necol" tautening dope. Metal work not subjected to outside exposure is given one coat of "Necol" black enamel. This means that the whole of the machine is finished with nitro-cellulose materials which have definite advantages in durability over oil finishes and at the same time, owing to their quick-drying nature, are quicker to use in production.

It should be noted that the above primer and filler are also used for the Desoutter two-colour schemes, which are increasing in popularity.

### TECALEMIT LUBRICATION.

The grease-gun system of lubrication has come to stay. This convenient method of lubrication is specially adapted for aircraft, as bearings which are difficult to lubricate in the normal way can be fitted with a remote nipple at the end of a length of tubing. This arrangement makes possible the placing of the nipple at the most convenient place.

The Desoutter Aircraft Co. Ltd. use such a system and have chosen the Tecazerk nipples. These are supplied by Tecalemit Ltd., who are specialists in this form of lubrication. The nipples are of the push-on type and, with the special form given to the nozzle of the grease-gun, ensure a leak-proof contact. The whole of the pressure which the operator exerts is transmitted to the circular line formed

MALLITE PLYWOOD
USED BY THE LEADING AIRCRAFT MANUFACTURERS
THROUGHOUT THE WORLD.
TELEPHONE BISHOPSGATE 5641 (4 LINES)
MANUFACTURED TO SPECIFICATION 3.V.3. BY.
THE AERONAUTICAL & PANEL PLYWOOD Co. Ltd. 218/226, KINGSLAND Rd. LONDON. E.2.
TELEGRAMS VICPLY, LONDON.

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by the angle of the nipple and the concave surface of the nozzle. The makers claim that all obstructions to a perfect contact are eliminated or crushed by the high pressure which results on this circular contact.

The Zerk guns supplied by Tecalemit Ltd. for use with these nipples give a very high pressure and as much as 5,000 lbs. per sq. in. is claimed to be obtainable with these guns. This surprising result has been got by arranging that only the amount of lubricant to be ejected, instead of the whole contents of the gun, shall be compressed by the plunger. The forward stroke of the plunger ejects the charge and its return stroke loads the chamber.

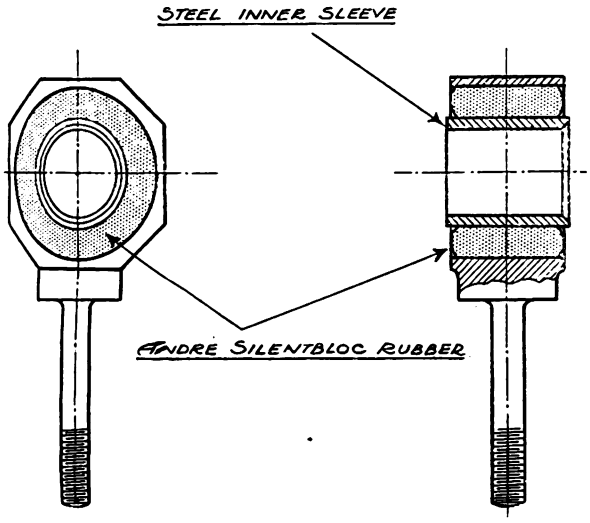
**FIREPROOFED CABIN LININGS.**

For some time the Desoutter Aircraft Co. Ltd. used for interior furnishing a Wool Pile Rep supplied by John Holdsworth and Co. Ltd., Empire House, St. Martin's-le-Grand, E.C.1. This did not however receive the sanction of the Air Ministry for use in the smoking compartments of aircraft.

After consultation with the manufacturers the decision was made to give this material special treatment. As a result it has now been approved by the Air Ministry for use in smoking compartments and this is the first occasion that a cloth of this kind has been so approved.

**INSULATING THE ENGINE MOUNTINGS.**

Rubber is an excellent shock-absorbing medium, and as applied to aircraft it, among other things, provides a satisfactory method of insulating the passengers and pilot from excessive engine vibration. The Desoutter Aircraft Co. Ltd. naturally makes every effort to keep this vibration down to a minimum, and therefore the Gipsy III engine is mounted on a very neat vibration-damping device known as the "Silentbloc" mounting. This is produced by T. B. André and Co. Ltd.




The "Silentbloc" mounting has an inner sleeve surrounded by a rubber bush which is compressed inside the outer case. The makers inform us that in the ordinary way rubber will only take 50 lbs. per sq. inch in compression, but in the "Silentbloc" mounting the rubber bush is stretched over the inner sleeve and compressed by the outer casing. This manipulation makes possible the use of a much higher loading per sq. inch.

Another use for the "Silentbloc" is the mounting of control points. The rubber adheres to the inner sleeve and the outer casing, but of course will stretch. The inner

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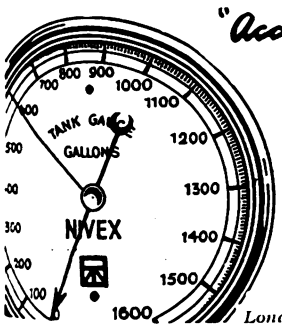


**and be sure**

With Nivex, it is unnecessary to carry a large excess of fuel, and still there is no chance of unexpectedly running out with subsequent forced landing. For aircraft, the importance of the Nivex can hardly be over estimated. Already fitted by Desoutter, and should be on every Aeroplane.

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**THE FLEET OF DESOUTTER AIRCRAFT OPERATED BY**

**THE NATIONAL FLYING SERVICES LTD.**

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as officially approved by the engine makers—Cirrus Aero Engines Ltd.

ADCOL N.P.5 surpasses the requirements of the Air Ministry's specification D.T.D.109—P.4—the most exacting test in the world for an aero engine oil.

**DUCKHAM'S ADCOL**
FOR BETTER LUBRICATION

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sleeve may be moved therefore through 90 deg. in either direction relative to the outer case, so that the device is quite suited to oscillating movement and requires no lubrication.

### SUPERFLEXIT.

Superflexit Ltd. are the producers of the well-known "Superflexit" Tubing, which, apart from being used by the Desoutter Aircraft Co. Ltd. for oil and petrol lines, is also largely used for this purpose by aircraft manufacturers, not only in Great Britain, but also all over the Continent.

The chief feature of the tubing is a patented lining which is absolutely and permanently impervious to the action of petrol, benzole and all the hydro-carbon oils. This lining is unaffected by temperature changes or climatic conditions, and it is equally suitable for the high temperatures experienced in the tropics or the extremely low temperatures experienced in high altitude flying.

"Superflexit" after long and severe testing has been approved by the Air Ministry for use on all aircraft for petrol, oil and water, and another interesting use for it is in connection with the oxygen breathing apparatus which is used in the R.A.F. for altitude flying.

"Superflexit is extremely flexible and as an indication of its flexibility, a six-inch tube built for the Royal Airship Works has been tested to bend on a radius equal to its own diameter instead of the usual testing radius of at least three times its own diameter.

Under official test a length of tubing was continuously vibrated for over 230 hours, during which time it made 47 million reversals without failure.

All fittings and connections for this tubing, which are of a patented type, are fully up to Air Ministry standards. They cannot loosen under intense vibration or be pulled out by any normal tensile load.

### STEEL TUBING.

Although the general construction of the Desoutter monoplane is of wood, steel tubing is used to quite a considerable extent for the more important stress-bearing members.

Tubing for axles, undercarriage struts, streamline wing-bracing struts and the engine-mounting are all supplied by the Reynolds Tube Co. Ltd., of Tyseley, Birmingham, who, it should be noted, supply practically all constructors of civil aircraft with their tubing requirements.

### PALMER WHEELS.

Palmer Wheels and Tyres have such a reputation in the Aircraft Industry, as indeed they have everywhere else, that one is not surprised to learn that they are fitted as standard to the Desoutter Sports Coupé. This machine is essentially a "limousine of the air" and the people who use it for comfortable touring must have the landing equipment that will enable them to land on any possible landing ground with confidence.

The Palmer Aircraft Brake which is creating such a favourable impression can be supplied as an extra to the Desoutter Mk. II.

These brakes are of the fluid-pressure type and have an annular expansion chamber to which are attached a complete ring of brake blocks. When the annular ring is inflated these blocks are forced against the interior of the brake-drum. The pressure required for even a considerable braking effect is small as there is nearly 100 per cent. contact between the brake-blocks and the drum.

### MALLITE PLYWOOD.

The Aeronautical and Panel Plywood Co. Ltd., has supplied quantities of its "Mallite" plywood to the Desoutter Aircraft Co. Ltd.

"Mallite" plywood is made from Canadian birch veneer, every sheet of which is strictly in accordance with the Air Ministry specification 3.V.3. A special adhesive of the company's own specification is used for glueing the veneers together.

"Mallite" is made in all thicknesses from 0.8 m/m. three-ply upwards and a large variety of sizes can be supplied up to 10 ft. long and 5 ft. wide. For the interiors of cabins "Mallite" can be supplied faced with oak, mahogany, walnut, or any other fancy wood to the customers' own specification.

Canadian birch, an Empire timber of a very close texture, is more durable and very much stronger than European or any other birch. Foreign-made birch plywood is produced on mass-production lines and does not consistently conform with the Air Ministry's specification. As a result, the Air Ministry has laid down a new specification for foreign plywood whereby every sheet must have a piece cut out for testing purposes. In addition the foreign product can only be produced in sizes which seldom exceed 5 ft. in length.

The company's latest product is Balsa plywood, which is the lightest in the World. Balsa wood, although extremely light, is of a soft and spongy nature and is not useable in its natural state. But when it is reinforced with thin hardwood veneers, aluminium or other metals, a unique combination of lightness, rigidity and strength is obtained.

The plywood of the Aeronautical and Panel Plywood Company is used by every country of importance throughout the World on account of its extreme reliability under exacting conditions.

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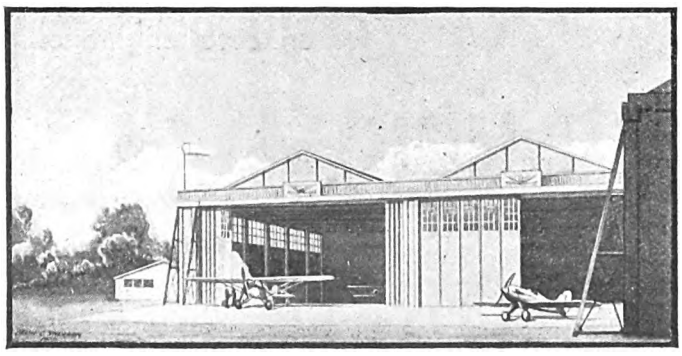

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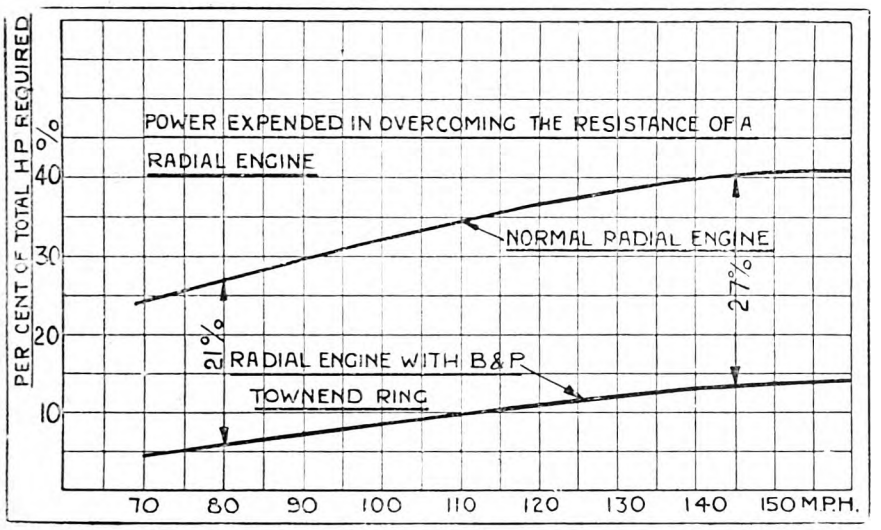
# TO USERS OF AIR-COOLED RADIAL ENGINES

Users of air-cooled radial engines are expending a large proportion of their engines' output in driving the engines themselves through the air.

The upper curve in the figure below shows the power expended, in the case of a machine with a 450 H.P. Radial engine, in overcoming the resistance of the engine at speeds of from 70 to 150 m.p.h. This wasted power is expressed as a percentage of the total H.P. required by the whole aeroplane at the particular speed.




The lower curve shows how the power thus wasted can be reduced by fitting the engine with a Boulton & Paul **TOWNEND RING.** This saving amounts to from 20% at low speeds to 27% at high speeds.

**25% REDUCTION IN POWER expended at cruising speed means either:**

(A) **25% REDUCTION IN FUEL CONSUMPTION for the same range and speed.**

**25% REDUCTION in engine output for the same range and speed, with a consequent increase in engine life between overhauls, reduced MAINTENANCE COSTS and increased reliability.**

**AN INCREASE IN PAY LOAD corresponding to the reduced weight of fuel required.**

***OR***

(B) **10% INCREASE IN CRUISING SPEED for the same engine power.**

**10% REDUCTION IN FLYING TIME for the same service, and hence**

**10% REDUCTION IN FUEL CONSUMPTION.**

**10% REDUCTION IN MAINTENANCE & DEPRECIATION.**

USERS OF RADIAL AIR-COOLED ENGINES INTERESTED IN SECURING ECONOMY IN OPERATION SHOULD APPLY FOR INFORMATION CONCERNING THE TOWNEND RING TO :—

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, September 30.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—361849 Sjt. A. H. Button is granted a perm. comn. as a Plt. Off. on probation with effect from Sept. 22 and with seniority of May 19.

The following are granted S.S. comns. as Plt. Offs. on probation with effect from and with seniority of Sept. 12:—J. R. S. Agar, H. L. Andrews, E. D. A. Bigg, G. R. Brice, T. H. Burleigh, F. Crump, P. F. Foss, A. H. Garland, M. V. Gibbon, T. P. Gleave, H. L. M. Glover, P. J. W. Hawkins, P. H. Heygate, P. W. Johnson, R. O. F. King, J. N. McAuley, R. A. McDonald, G. E. B. Nixon, P. J. Polglase (Sec. Lt., R.A., T.A.), G. F. A. Skelton, C. G. Skinner, H. E. Slowey, A. Taylor, J. A. Tester, R. Williams. W. F. Hilchie is granted a S.S. comn. as a Plt. Off. on probation with effect from Sept. 22 and with seniority of Sept. 12.

The following Plt. Offs. are promoted to the rank of Flg. Off. (Sept. 15):—R. F. Fletcher, A. J. Tunnard.

The following are seconded for duty with the Imperial Japanese Navy (Sept. 26):—Sq. Ldr. R. W. Chappell, M.C., Flt. Lt. J. L. Wingate.

Sq. Ldr. J. S. T. Fall, D.S.C., A.F.C., remains on half-pay, scale B, Oct. 1 to 31 inclusive.

The following Flg. Offs. are transferred to the Reserve, Class A:—W. E. Barnes, H. G. Loch, W. C. McNeil, L. H. Mason (Sept. 26); F. G. Downing, K. Garston-Jones, W. L. Whitlock (Sept. 28); E. A. T. Murray, F. F. Barrett (Sept. 30). Lt. J. W. M. Healing, R.N., ceases to be attached to the R.A.F. on return to Naval duty (Sept. 15). The S.S. comn. of Plt. Off. on probation A. E. B. Trappes-Lomax is terminated on cessation of duty (Oct. 1).

DENTAL BRANCH.—Flt. Lt. (Hon. Sq. Ldr.) E. A. Wheeler, L.D.S. (Temp. Maj., Army Dental Corps), is transferred from the Army to the R.A.F. (July 1). The undermentioned Flt. Lts., R.A.F., Temp. Capts., General List, Army, Dental Surgeons, are transferred from the Army to the R.A.F. (July 1):—C. F. Pitt, L.D.S., A. R. H. Bennett, L.D.S., A. P. McClare, L.D.S.

The following Flg. Offs., R.A.F., Temp. Lts., General List, Army, Dental Surgeons, are transferred from the Army to the R.A.F. (July 1):—B. L. Harrington, B.D.S., A. P. Atkins, L.D.S., M. J. Pigott, B.D.S., C. M. Leckie, L.D.S.

Flg. Off. B. L. Harrington, B.D.S., is granted a non-perm. comn. as a Flg. Off. (Aug. 27).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Lt.-Col. Sir F. H. Humphrys G.C.V.O., K.C.M.G., K.B.E., C.I.E., is granted a comn. in Class C as an Air Commodore (Sept. 30).

The following Flg. Offs. on probation are confirmed in rank:—E. K. Wallis (July 8); J. W. Brown (Sept. 25).

The following Plt. Offs. on probation of the Special Reserve are confirmed in rank:—D. W. Reid (July 8); C. W. Lindsay (Aug. 30); F. B. Bristow (Aug. 30).

Plt. Off. R. C. Newton, of the Special Reserve, is promoted to the rank of Flg. Off. (Sept. 7); Flg. Off. C. H. Howitt is transferred from Class B to Class C (Aug. 21); Flg. Off. V. C. Taylor is transferred from Class A to Class C (June 22).

The following Flg. Offs. relinquish their comns. on completion of service:—S. S. Kirsten (July 27); G. Colledge (Sept. 6).

Flg. Off. A. J. Martin relinquishes his comn. on completion of service and is permitted to retain his rank (Sept. 12).

The following Flg. Offs. relinquish their comns. on appointment to comns. in the Indian Army (Sept. 16):—W. J. M. Spaight, J. C. Lewis.

The comn. of Plt. Off. on probation M. D. R. Meiklejohn is terminated on cessation of duty (Sept. 2).

STORES BRANCH.—The following relinquish their comns. on completion of service and are permitted to retain their rank (Sept. 12):—Sq. Ldr. H. G. Etheridge, Flg. Off. J. S. Viner.

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—Plt. Off. S. Davidson is promoted to the rank of Flg. Off. (Aug. 3).

No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—The following to be Plt. Offs.:—G. Shaw (Aug. 29).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE.

Sister Miss A. M. Herd resigns her appointment (Oct. 1).

## Appointments.

*Week ending October 6, 1930.*

GENERAL DUTIES BRANCH.—Wing Commanders G. W. Williamson, O.B.E., M.C., to H.Q., Wessex Bombing Area, Andover, for Engineer Staff duties, 22/9. N. C. Spratt, O.B.E., to Station H.Q., Duxford, to command, 29/9.

Squadron Leaders H. M. Probyn, D.S.O., to No. 25 Sqdn., Hawkinge, 29/9. R. W. Chappell, M.C., to Special Duty List, 26/9.

Flight Lieutenants J. L. Wingate, to Special Duty List, 26/9. R. H. Barnaby, to No. 7 Sqdn., Worthy Down, 27/9. A. H. Montgomery, to No. 32 Sqdn., Kenley, 24/9. J. R. I. Scambler, A.F.C., to R.A.F. Depot, Uxbridge, 2/10. N. S. Allinson, to H.M.S. *Hermes*, 1/10.

Flying Officers D. J. Waghorn, to R.A.F. Depot, Uxbridge, 17/9. L. T. Kerry, M.C., to R.A.F. Record Office, Ruislip, 23/9.

Pilot Officers V. C. F. Streatfeild, to No. 3 Sqdn., Upavon, 15/9. H. C. O. Loughlin, to R.A.F. Depot, Uxbridge, 23/9. A. H. Button, to No. 9 Sqdn., Manston, on appointment to a Perm. Comn., 22/9. K. M. Cass, to No. 6 Sqdn., Ismailia, 14/9. J. B. Tutnall, to No. 45 Sqdn., Helwan, 14/9. H. de M. Middleton, to No. 47 Sqdn., Khartum, 19/9. L. A. Cubitt, to No. 216 Sqdn., Heliopolis, 14/9. G. G. Dixon, to No. 216 Sqdn., Heliopolis, 14/9. D. W. H. Heath, to No. 70 Sqdn., Hinaidi, 15/9. The undermentioned are all posted to No. 5 F.T.S., Sealand, with effect from 27/9:—J. R. S. Agar, H. L. Andrews, E. D. A. Bigg, G. R. Brice, T. H. Burleigh, F. Crump, P. F. Foss, A. H. Garland, M. V. Gibbon, T. P. Gleave, H. L. M. Glover, P. H. Heygate, P. W. Johnson, R. O. F. King, J. N. McAuley, R. A. McDonald, G. E. B. Nixon, P. J. Polglase, G. F. A. Skelton, C. G. Skinner, H. E. Slowey, A. Taylor, J. A. Tester, R. Williams.

STORES BRANCH.—Flying Officers C. M. P. Hartley, to No. 6 Sqdn., Ismailia, 23/8. R. B. Fleming, to H.M.S. *Hermes*, 25/9. M. J. Scott, to H.Q., R.A.F., Middle East, Cairo, 3/9.

## Fatal Accidents.

The Air Ministry regrets to announce that as the result of accidents at Arundel Park, Sussex, to three Bulldog machines of No. 17 (Fighter) Sqdn., Upavon, Wiltshire, on Sept. 30, Flt. Lt. Gerald Christopher Allan Armstrong, the pilot of one of the aircraft, was killed. No. 326793 Sjt. Wilfred Birkishaw, the pilot of the second aircraft was dangerously injured and died later on the same day. Plt. Off. Geoffrey John Pawson, the pilot of the third aircraft was slightly injured. No passengers were carried in any of the machines.

An inquest was held at Arundel on Oct. 1.

Sq. Ldr. Richard Harrison, who identified the bodies, said that they were attached to the Upavon Station and temporarily stationed at Tangmere for air exercises. Armstrong was leading a flight of three Bristol Bulldog single-seaters, with instructions to patrol the air immediately north of Amberley. The other machines were occupied by Sjt. Birkishaw and Plt. Off. G. J. Pawson. The atmosphere was clear over the aerodrome, with light clouds to the east. The airmen were experienced flyers and had been in the district the previous day. The visibility was sufficiently good for them to fly with safety. The previous patrol had reported that while flying at 3,000 ft. they had noticed the ground obscured in places by cloud. They could, however, see the aerodrome.

Plt. Off. Pawson said that they were flying at 3,000 ft. The ground became obscured with cloud. They dived down through this and suddenly hit the trees.

The Coroner asked whether the trees were obscured all the time until the machines hit them. The witness said that they were and that the mist was lying on the ground.

A verdict of accidental death was returned.

## R.A.F. Appointments.

The Air Ministry announce the following appointments:—

The Reverend Sidney Lampard Clarke, M.A., B.Sc., to be Chaplain-in-Chief to the Royal Air Force with effect from Dec. 11, 1930, in place of the Reverend Robert Edward Vernon Hanson, O.B.E., M.A., K.H.C., on the latter being placed on the retired list.

Matron Miss Katherine Christie Watt, R.R.C., to be Matron-in-Chief, Princess Mary's R.A.F. Nursing Service, with effect from Nov. 29, 1930, in place of Miss Joanna Margaret Cruickshank, C.B.E., R.R.C., on the latter being placed on the retired list.

## The Esher Trophy.

The Lord Esher Trophy which is awarded annually to the most efficient Squadron in the Auxiliary Air Force has been won this year by No. 605 (County of Warwick) (Bomber) Squadron with a total of 1,519 marks out of a possible 2,000.

This is the second time this Squadron has won the Trophy.

The Squadrons of the Auxiliary Air Force with the highest number of hours flown during the months of June, July, and August, 1930, were as follows:—

No. 605 (County of Warwick) Squadron 933 hours.
No. 600 (City of London) Squadron 665 hours.
No. 601 (County of London) Squadron 607 hours.

Marks for the Esher Trophy are also awarded for bombing, ground efficiency, and general maintenance.

## Special Assessments.

The following officers and airmen have been awarded special assessments as shown on completion of a course of *ab initio* flying training at No. 1 Flying Training School:—

*Special Distinctions*:—Plt. Offs. G. D. Emms, J. E. C. McClure, W. B. J. Sharp, L. Watson, and No. 364864 A/Sjt. A. F. Johnson.

*Distinguished Passes*:—Plt. Offs. A. C. Bailey, H. D. Primrose, G. R. Stroud, J. H. Supple, No. 370203 A Sjt. S. W. Byrne, No. 365730 A/Sjt. W. N. Griffiths, No. 363656 A Sjt. G. T. James, and No. 363105 A Sjt. R. V. Moxey.

Notations have been made in the official records of the officers and airmen.

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**Flt. Lt. C. W. Hill, R.A.F.** —(*"Aeroplane" photograph.*)

### The Familiar Spirit.

Flt. Lt. C. W. Hill, R.A.F., who is attempting to fly to Australia, is one of the two British officers whose ingenuity and almost superhuman endurance led to their release from a Turkish war prison. The epic story of their plot and the heroic way they maintained their amazing deception is told in *The Road to Endor,* the book that was written after their return by Lieut. Jones. The latter part of their story is also told by Lieut.-Colonel T. W. White of the Australian Flying Corps, who was in hospital with Flt. Lt. Hill in Constantinople and describes the great adventure in his book *Guests of the Unspeakable.*

Everybody who has read these two books will wish Flt. Lt. Hill the best of luck in his new venture.

### The R. M. Groves Memorial Prizes.

The R. M. Groves Memorial Fund, under the conditions of the trust, ends in 1931. A further sum of money has, however, been placed at the disposal of the Air Council by Mrs. J. G. Groves, the mother of the late Air Commodore R. M. Groves, C.B., D.S.O., A.F.C. This sum, added to the unexpended balance of the original fund will form a new trust to be dedicated in perpetuity to the promotion of the practical side of flying and for the encouragement of *esprit de corps* and disinterested devotion to duty in the R.A.F., and as a memorial to the late Air Cmdre. Groves.

The income from the new trust will be applied to a prize to be called "The R. M. Groves Memorial Prize," which will be awarded twice a year, on the recommendation of the Commandant of the R.A.F. College, to the flight cadet who, on his passing out of the College, is selected as being the best all-round pilot of his term.

The prize will consist of a grant of money and a set of bound volumes containing a portrait of the late Air Commodore Groves, with a reproduction of his autograph and a suitable inscription concerning the nature of the prize. Within certain limits the choice of books will be left to the recipient of the award. The first prize under the new trust will be awarded to the flight cadet selected from the term passing out in December 1931.

### Extension of Service in the Reserve.

The service of the following officers of the Reserve has been extended for a period of five years:—

*Class A.* Flg. Offs. A. C. Campbell-Orde, A.F.C., H. W. Petter, W. A. Ramsay.

*Class C.* Flt. Lt. C. W. Bailey. Flg. Offs. C. H. Howitt, N. E. D. Hutchinson, B. P. Jones, J. C. Joynt.

*Class B.B.* Flg. Off. A. H. A. C. Cranmer.

The service of the following officers has been extended for a period of four years:—

*Class A.* Flt. Lt. A. R. T. Pipon, D.S.C. Flg. Offs. G. L. Blake, P. K. Campbell, J. S. J. Craigen, E. S. Edwards. G. Gardner, J. T. Hall, M. E. de L. Hayes, L. G. A. Kirchner, R. G. Mollard, R. P. Mollard, J. B. Stockbridge.

*Class B.* Flt. Lt. E. L. Johnston, O.B.E., A.F.C.

The service of the following officer has been extended for a period of three years:—

*Class A.* Flg. Off. J. McCosh.

The service of the following officers has been extended for a period of one year:—

*Class A.* Flg. Off. H. C. Cooke, S. H. Cooper, A. C. W. Richards.

### THE WAR BIRDS AGAIN.

[*Contact, A Romance of the Air,* by Elliott White Springs. 273 pages, 7¼ ins. x 5 ins. John Hamilton Ltd. From The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4., 8s. post free.]

Elliott White Springs, the Author of *Contact, Nocturne Militaire, Above the Bright Blue Sky* and *Leave Me With a Smile,* and the editor of *War Birds, the Diary of an Unknown Aviator,* needs little introduction to readers of The Aeroplane. He was one of a number of American cadets who came to England in 1917, learned to fly in this country, and fought most gallantly in France and Flanders with the Royal Flying Corps.

Quite a lot of good books about the R.F.C. have been written by Englishmen, but the vigorous frankness of this American author's work has disclosed a good deal that the more restrained style of English authors would have left unsaid. Mr. Springs does not pretend that his book is accurate history but, as he explains in the foreword, it is based on the long letters that he wrote to his father while he was serving in 1917 and 1918. He claims that the places and events are authentic and that the central characters only are composite. Certainly some of his characters are easily-recognisable types.

Most war books can be divided into two distinct types. There are those by men who got the better of the War and there are those by men who let the War get the better of them. The former are mostly by the soldier-type and the latter by the professional writer. Mr. Springs' books come, in a way, into both categories. He tells a good yarn as the fighting man tells it, and yet sometimes he becomes nearly as neurasthenic as a professional writer. But though he is often funny and sometimes "wet," he is never, never, dull.—C. M. MCA.

### THIRTEEN WEEKS BEHIND THE LINES.

[*Missing,* by Talbot Baines Bruce, M.C. Edited, with foreword, by E. D. Cuming. 246 pages, frontispiece and map. Wm. Blackwood and Sons Ltd. From The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4. 5s. 3d. post free.]

The author of this absorbing story was serving with the R.F.C. in 1917 when he, and others of his squadron, lost their direction on patrol and landed in a field about 100 miles behind the enemy lines. The other three machines of the formation were able to take off again, although they had to land later owing to shortage of petrol, and the pilots were taken prisoner, but T. B. Bruce, whose engine would not start again, had to burn his machine and try to escape.

*Missing* is the story of the thirteen weeks he spent in enemy occupied territory disguised as a Belgian peasant and his eventual escape through Germany into Holland. His adventures are well told and in spite of, or perhaps because of, the direct simplicity of the language the reader follows him eagerly from excitement to despair and back to the final thrill of his escape.

The book is dedicated to those brave and loyal Belgians who, at the risk of their lives, harboured and assisted him in his escape. The self-sacrifice of those people and the courage and determination of the author make a stirring tale.—C. M. MCA.

### SPIES AND SUBMARINES.

[*Ordeal by Air,* by John Scott Hughes. 277 pages. Longmans, Green and Co. From The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4. 7s. 9d. post free.]

The author of this entertaining novel was serving as an A.B. in a ship on the China Coast Trade when war broke out. He returned to England, joined the R.N.V.R., got a commission and was transferred to the R.N.A.S. There is no suggestion that the actual plot of *Ordeal by Air* is founded on fact, but the author's experiences in the R.N.A.S. give special life and interest to the descriptions of submarine-hunting and life at a seaplane-station during the War 1914-18.

This is not a book for the sophisticated but it is an excellent book for those young enough to lose themselves in a stirring tale of adventure.—C. M. MCA.

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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### SURREY STARTS WELL.

The Surrey Aero Club, Ltd., is a young club, formed this summer, which has already got well into its stride. It celebrated its youthful prosperity at Gatwick Aerodrome, Lowfield Heath, with great *éclat*, on Oct. 4.

We have often wondered what would happen to young clubs without their periodical flying meetings to interest the public, who after all do turn up trumps at these affairs, which are always quite unpredictable in quality and interest. We have also wondered still more often what the flying meetings would do without the half-dozen or so godfathers of sport-flying who make the programmes as good as they usually are.

On that Saturday the names appeared on the programme of Flt. Lt. Tom Rose—and the fact that for once he was not present cannot rob him of the credit of having been a star turn at nearly every meeting this year,—Mr. S. A. Thorn, Mr. T. Neville Stack, and Mr. R. R. Bentley. These are the old guard; and Mr. John Tranum with his parachute practically qualifies for inclusion in that squad. Mr. John Rogers is not the veteran that these others are, but his well-known and super-slow-flying monoplane has decidedly done its bit this season. Mr. George Murray, easily the outstanding virtuoso of aerobatics among English pilots who have never had Service training, is less often seen, but is well worth it when he does attend.

These stalwarts, whether they appear by courtesy of their various employing companies, or in their own machines from sheer love of the game, deserve the plaudits of the mob at this, the end of the season, for putting on first-class programmes from one end of England to the other, that were no whit less rare in quality because they happened every week-end and cost the clubs little or nothing, while filling their most remunerative enclosures with delighted citizens. And what, moreover, could be done without Airily Ministerial Authority in the altogether charming person of Mr. J. J. Jeffs?

Obviously a leaf or two of laurel is indicated for their persistently air-cooled brows.

Apart from the spectacular performers of long standing are the steady arrivals, like Lt.-Col. Louis Strange and his Spartan crew. Mr. E. C. Brown is becoming a regular turn on the loud speakers and is doing it better every week at—wherever it happens to be.

Last, but by no means least, Mr. Hubert Broad was at Gatwick on Saturday, but unobtrusively and unaerobatically, in a yellow Puss-Moth. He frankly admits that he intends to spend his old age inside cabins and, although the Puss-Moth is quite stuntable, practically admitted his preference for legitimate commercial attitudes in future.

Of the actual programme little can be said that has not been solemnly set forth weekly in the past. Mr. Thorn's aerobatics were as polished as they always are, and Mr. Stack's had their usual admirable mixture of exactitude and vim. The converging bombing by these two really came near its ambitious title, and the flour bags were much more accurate than we have seen before.

Mr. John Rogers flew very, very slowly, and Mr. George Murray flew fast, each side up by turn, and did an inverted loop—nearly. He came over but not quite squarely enough.

The comedy turn, starring a Surrey Club Moth at large with a drunken yokel, was more exciting than usual by reason of Mr. R. B. Waters, the chief instructor, very well concealed in the front cockpit. The sight of a Moth taking off at all angles with a man half into the rear cockpit and having trouble with his trousers, gave rather a turn even to those in the know.

Mr. Bentley crazy-flew with habitual disregard for his own health, and Mr. Allen, of Henly's, took up an Avian (Hermes) and proved himself worth anyone's gate money. His two turns of upward spin, flying out at the top, made a great impression.

Mr. Tranum went up with Col. Strange and made a delayed drop which brought him squarely into the aerodrome, which is none too large.

During tea, which was served in the hangar very nicely indeed, the noise as of a rushing mighty wind from the blind side made everybody duck. The fleeting shadow that dipped roaring past the entrance was only Flt. Lt. Armour arriving with the Segrave Meteor at 140 m.p.h. The pilot was immediately pressed into service for an extra turn of crazy flying—but on a Moth. The Meteor is now an indecorous shade of red but looks highly workmanlike.

Visiting aeroplanes:

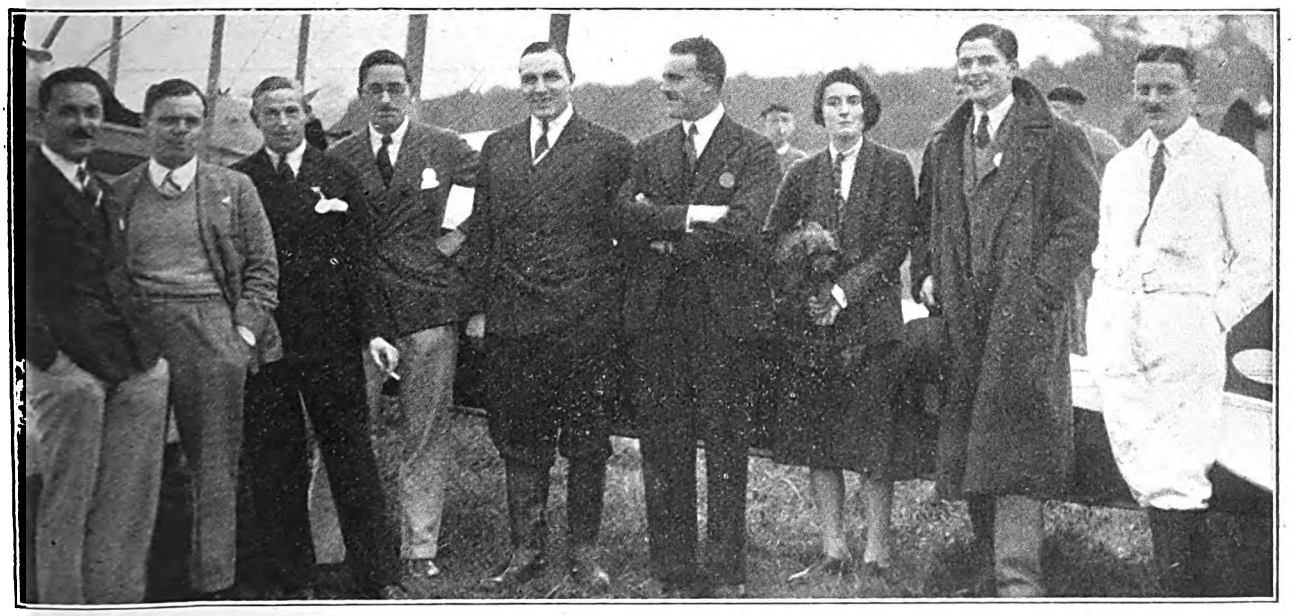
*Moths* (*Cirrus*), Mr. Gee. (*Gipsy*), Messrs. Brown, Tapper, Murray and others. (*Hermes*), Mr. Stack.
*Puss-Moths* (*Gipsy III*), Messrs. Broad and Bentley.
*Desoutter* (*Gipsy III*), Mr. Youell. (*Hermes*), Mr. Pennington.
*Avians* (*Hermes*), Messrs. Thorn, Allen and Mortimer.
*Spartan* (*Gipsy II*), Col. Strange. (*Hermes*), Mr. Andrews.
*Klemm* (*Salmson*), Mr. Rogers.
*Robinson Redwing* (*A.B.C. Hornet*), Mr. Robinson.
*Segrave Meteor* (*two Gipsy III's*), Flt. Lt. Armour.
*Bluebird* (*Gipsy I*), Mr. van Oppen.
*Junkers Junior* (*Genet*), Mr. Trost.
*Avro 504K* Surrey Flying Services Ltd.
*Handley Page W8* (*two Rolls-Royce Eagles*), Aviation Tours Ltd.

### THE ANNUAL BALL AT NORWICH.

The Norfolk and Norwich Aero Club are holding their Annual Ball on Nov. 25 at St. Andrew's Hall, Norwich. This is always such a jolly affair, and so popular, that, although full particulars are not yet available, a brief notice like this is justified in that it prevents people from making other arrangements for that night.

### A FLIGHT ABANDONED.

Mr. Kenneth Shenstone and Mr. Pat Fairbairn are returning by boat from Egypt, which they recently reached on an attempt to fly to Kenya in their Moth (Gipsy I). They damaged the machine seriously when landing it at Heliopolis Aerodrome, Cairo, on Sept. 28, but were fortunate enough to escape without serious injury.



A GATWICK GATHERING.—Messrs. Brown, Millet, Chapman, Tapper, Jeffs, Waters, Miss Reynolds, Mr. Reynolds and Mr. Bell.—(*"Aeroplane" photograph.*)

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## THE AIR RACE TO AUSTRALIA.

A week or two ago a number of people had announced their intention of flying to Australia quite fast, and all at about the same time. With the idea of adding to the interest, which the participants might be expected to encourage, and considerably reducing the danger, to which object they could hardly object, The Aeroplane suggested making a race of it. As a result, we modestly assume, of such suggestion, a very respectable prize of £1,000 was offered by *The Daily Telegraph,* provided that four contestants faced the starter.

Mr. F. R. Matthews started the ball rolling by leaving on Sept. 16, preferring not to wait for the gun. He set a record as far as Rangoon, which must content him at present until his Puss-Moth is repaired.

A certain uncertainty pervaded the rest of the prospects, although a field of four seemed a possibility for a while.

Mr. George Murray has decided not to go, for private reasons.

Mr. Neville Stack was never really in the running although he tried, without success, to make business as usual fit in with a week or two's jaunt to Australia as soon as he heard there would be company and a little competition.

Mr. Charles Barnard is thoroughly under the weather with what is very like a nervous breakdown.

Sq. Ldr. Kingsford Smith is all prepared with a Sports Avian (Gipsy II) to get away, but he too is by no means strong after his operation in Holland. Medical advice is all against his starting at all just now, but he will do so as soon as possible. He has stated that he will make fast time if he can, but that he had definitely no intention of flying throughout the daylight hours, servicing his machine, and starting away day after day with only three or four hours' sleep, because his health is not in the state for it.

There are two actual starters so far. One is G-ABEN, a standard Gipsy-Moth with extra tankage, piloted by Flt. Lt. C. W. Hill. He left Lympne on Oct. 4 and reached Budapest on Oct. 6.

The other is G-ABEJ, a Puss-Moth (Gipsy III), with tanks for 80 gallons of fuel and a calculated range of 1,650 miles. The occupants are Mr. C. J. Chabot and Major C. E. M. Pickthorne, and their programme is a really ambitious one of a seven-day journey in long stages.

The stages originally set were as follows:—Croydon—Belgrade 1,050 miles: Belgrade—Aleppo 1,240 miles: Aleppo—Basra 787 miles: Basra—Karachi 1,396 miles: Karachi—Calcutta 1,300 miles: Calcutta—Bangkok 1,250 miles: Bangkok—Batavia 1,190 miles: Batavia—Atamboea 1,590 miles: Atamboea—Port Darwin 480 miles.

The nine stages will imply doing two stages in each of two days if the plan for a seven-day journey is carried through.

Their plan is said to involve the novel and dangerous expedient of flying throughout the nights. They have a long range, if their engine should uphold the Gipsy reputation for dependability, but flying over strange and unlighted country in the dark is a highly risky procedure.

On the first day they reached Zemun, the aerodrome of Belgrade, after the worst passage in their experiences.

### MR. MATTHEWS' DELAY.

The accident to Mr. Matthews' Puss-Moth at Muang Don, Siam, is expected to delay him for about three weeks on his flight to Australia. He hopes to beat Sq. Ldr. Hinkler's record on the way back.

## A PASSENGER'S POINT OF VIEW.

The Desoutter monoplane was the pioneer of comfortable air travel for the private owner, and, in the new Mark II model, comfort has become luxury. Not content with their earlier success the constructors have embodied in the Mark II a number of fittings which make it a thing of joy to travel in under all weather conditions and during the longest possible journey.

An experienced woman air traveller alighting from a trip to 15,000 feet, during which she had worn ordinary clothes and not even an overcoat, expressed herself delighted with the comfort of the machine.

The present writer, whose flying has been mainly confined to the comparative hardships of the spare accommodation in Service aircraft, accepted, on Oct. 2, an invitation from the Desoutter Company to take a short flight as a passenger in the Desoutter Mark II monoplane. During a flight in one of the early models last year one had suggested that the passengers' seat was not quite comfortable enough for a long journey and that one would like to see some form of strap or handle for the nervous or inexperienced to grasp during steep banks in the air. In the new machines both these omissions have been adequately fulfilled. The seats are now as comfortable as those in the most luxurious motor-cars and the silk rope handle for each passenger seat would be equally convenient for the nervous and to help elderly or infirm passengers to alight from the machine.

The windows have also been improved and the passengers can open or shut the side windows. Overhead is a large panel, the light from which gives a feeling of spaciousness to the cabin. An accessible rip-cord opens this panel and makes a good exit in emergency. The windows in the front have also been improved and the pilot gets an excellent view and what ventilation he requires without getting the rain in at the same time.

Even with the windows open the passengers can talk to each other without raising their voices, and to the pilot with very little effort. This exceptional quietness has been achieved by bedding the engine on rubber.

During the trip on Oct. 2 the machine flew, under perfect control, at 40 m.p.h. and going full out did over 127 m.p.h.—a remarkable range of speed.—C. M. MCA.

### ANOTHER MIXED PARTY.

On Oct. 11 and Oct. 13 Phillips and Powis Aircraft Ltd. are organising a mixed Gliding and Light Aeroplane Meeting at "The White Horse" Hill, Yatesbury. The occasion is to mark the opening of the Wiltshire Light Aeroplane Club.

Yatesbury is between Marlborough and Chippenham, on the main Bath Road. For those who arrive by air there will be accommodation in hangars at the old R.A.F. aerodrome at Yatesbury. This aerodrome lies along the road, and the best landmark from the air is "The White Horse," which is on the Downs, on the opposite side of the road.

For those who arrive by car there is a big Car Park close to the gliding site. Col. The Master of Sempill, Mr. Latimer Needham, and Mr. Lowe Wylde are to give demonstrations. Herr Kronfeld has been invited, and the organisers hope that he will be there.

[If the wind happens to be from the north the gliding should be fine. If not, not. And the road up to the White Horse is not recommended to any but thoroughly robust automobiles or pedestrians.—Ed.]

**THE SPORTS MODEL.—A Sports Avian (Hermes) at Gatwick. The pilot, Mr. Allen, of Henly's Ltd., is seen talking to Mr. Olney, of Cirrus Engines Ltd., and Mr. Harold Perrin.**—(*"Aeroplane" photograph.*)

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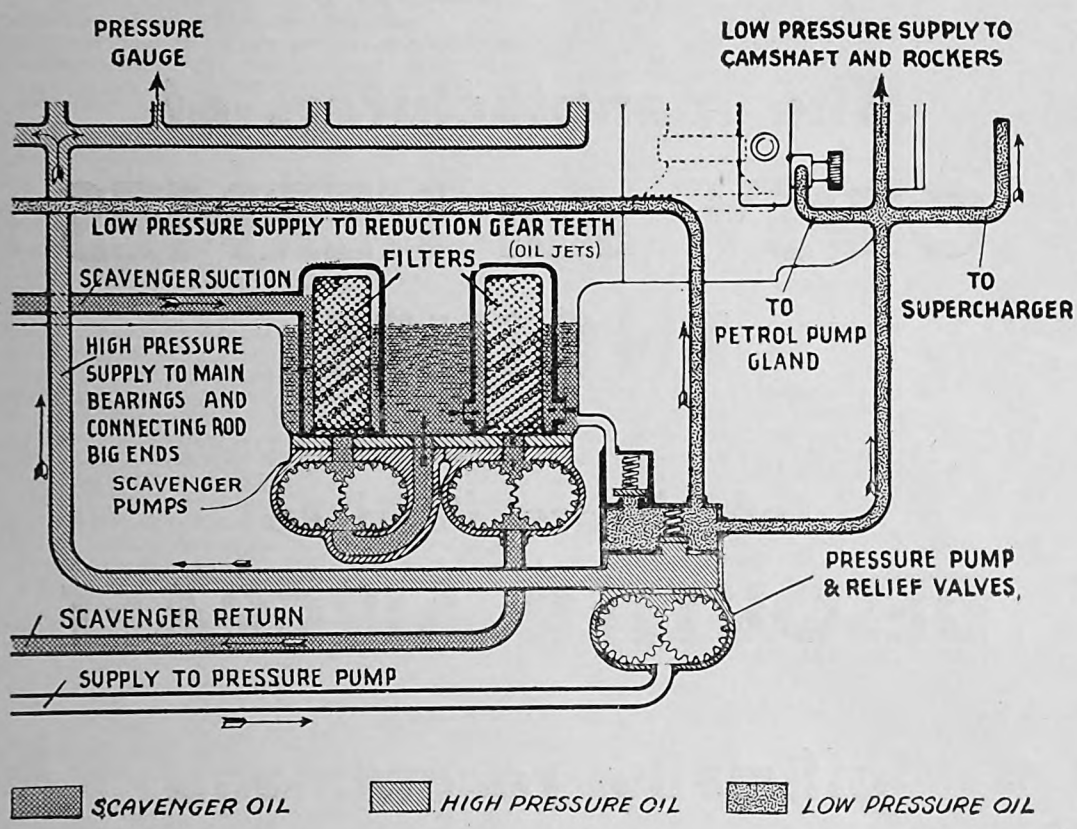


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## CANADA MEETS THE PUSS-MOTH.

The enthusiastic reception to which the Puss-Moth is accustomed has been duly accorded to it in Canada. Secure in the knowledge that in the Puss-Moth they had an aeroplane exactly suited to Dominion conditions, the De Havilland Aircraft of Canada Ltd. drew up an ambitious programme, which opened with the organisation of two flying garden parties at their aerodrome at Toronto. Invitations were issued to the Mayor, the principals of the Toronto Flying Club and of other flying clubs in the district, the Controller of Civil Aviation and numerous other influential residents. Some 1,500 invitations were issued and over 400 people attended.

Free flights were the principal attraction and over 150 guests availed themselves of this opportunity of making an early and intimate acquaintance with the Puss-Moth.

Aerobatics and similar displays were deliberately omitted, as it is considered that such manœuvres are calculated to convey to the mind of the onlookers a wrong impression of aviation. Refreshments were arranged on a generous scale, and with the assistance of excellent weather the two parties were a marked success.

Talks were broadcast at intervals on the characteristics, flying qualities, comfort, etc., of the Puss-Moth. These talks were interspersed with announcements of the programme and with music.

Mr. J. A. Wilson, the Controller of Civil Aviation, was among those who made a flight in the Puss-Moth and, in common with others who went up, was most enthusiastic.

After the "aerodrome" qualities of the Puss-Moth had thus been effectively demonstrated the next step was obviously to exhibit its speed, reliability and general utility as a long-distance vehicle. After demonstrations at Ottawa, Montreal and other centres it was decided to exhibit the aeroplane at a flying meeting which was to take place at Winnipeg.

A direct route between Toronto and Winnipeg involves flying long distances over the Great Lakes, and for this reason is totally unsuited to a land machine. A decision was therefore made to do the journey by way of Detroit, Chicago, Madison, St. Paul, Fargo and Grand Forks. Advantage was to be taken of this route by Mr. Geoffrey O'Brien, the pilot, and Mr. G. Mickleborough, his passenger, both of The de Havilland Aircraft Co. of Canada, to pay several business calls on the trip. In spite of a 35-mile an hour head wind all the way up the Mississippi Valley, the trip of 1,400 miles was accomplished in 14½ flying hours.

The following extracts from a letter recently received from Mr. Loader, the General Manager of the Branch Company, describe the early morning start of the Puss-moth from Toronto:—

> They were on the aerodrome by 2.30 a.m. E. Standard Time, loaded their luggage on board and ran the engine up. As usual it started first pull over. At 3.15 the moon was practically full and well up in the sky. A faint glow in the North-East showed that the sun was somewhere near rising. They climbed on board and taxied across the field—no navigation lights were fitted. It was quite thrilling to watch. About 150 yards from the hangar they went out of sight, and by the time they reached the end of the field, in spite of the stillness, the engine went out of earshot.
>
> When the throttle was opened to turn we heard a faint roar which died down momentarily. Then a steady crescendo and in about 15 seconds we saw the machine dimly outlined against the sky. As it passed the hangars by which we were standing, the moon shone on the side of the cream fuselage. It turned gently on to its course and in 20 seconds was again lost to view. In less than a minute the noise of the engine disappeared. Then we went home to bed for a couple of hours. Even half an hour later the sun had not risen.

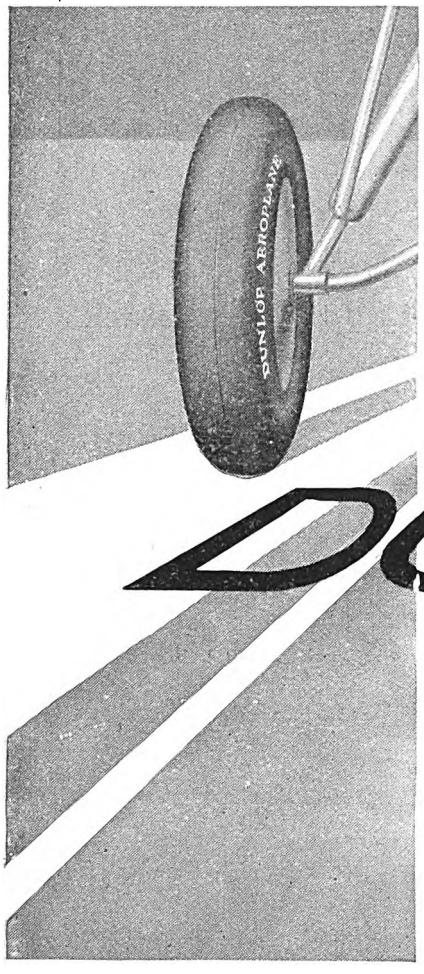
After demonstrations at Winnipeg the trip was extended to Vancouver by way of Regina, Moose Jaw and Calgary. The Puss-Moth stayed five days at Vancouver, where it gave demonstrations and flights to British Columbian aviation enthusiasts.

On the return trip a diversion was made to Edmonton and Saskatoon before returning to the outward route. On the last day the journey from Winnipeg to Toronto was made in 12 hours' flying.

Messrs. O'Brien and Mickleborough describe the tour as a "glorious holiday" and say that they arrived "fresh as daisies and without a suspicion of tiredness."

The Puss-Moth was enthusiastically received everywhere, and the Gipsy engine behaved as a Gipsy engine should. In addition to the double flight across the Continent, a total distance of 6,050 miles, in 57 flying hours, at an average speed of 104 miles an hour, the Puss-Moth carried over 250 passengers, which involved an additional 29 hours' flying time.

This flight was not a "stunt" flight. Although records were obtained, no records were coveted, and neither comfort nor business was sacrificed to mere speed. The de Havilland Aircraft of Canada Ltd. were out to demonstrate the very real practicability of aircraft in general, and of the Puss-Moth in particular, for long-distance work. There is no doubt that they did what they set out to do, and did it well.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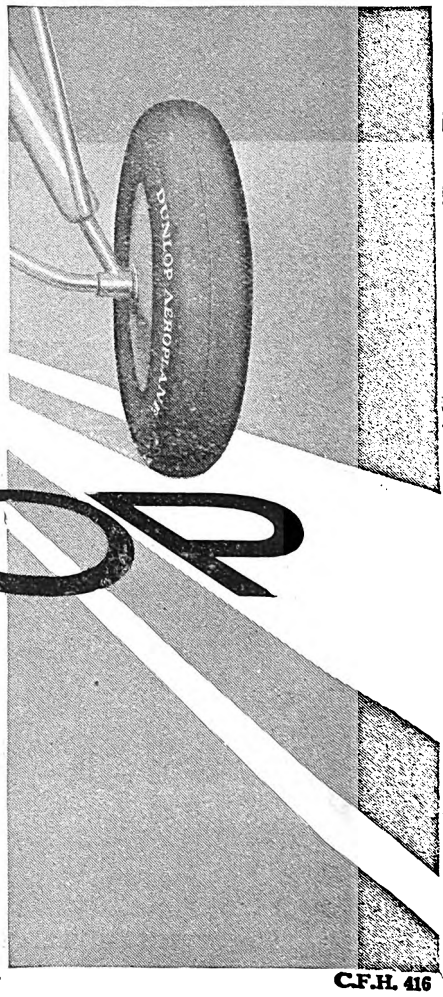


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# "The Sailplane."

**The only British paper devoted exclusively to the Sport of Gliding is "The Sailplane." Subscription, Three months, 3s. post free. Single copies 3½d. from 175, Piccadilly, London, W.1. One or two copies of the fifth issue are still to be had, price 4½d. post free.**

**"The Sailplane" can only be had by post from this office. The price has been fixed at threepence to encourage the young gliding enthusiast and such a low price will not stand Trade and Wholesale Discounts amounting to 30% or 40%. Therefore it cannot be bought from News Agents. There is practically no advertisement revenue to make up for the losses on sales. And if the Gliding Movement is what it sets up to be it will support its own paper.**

**Although the copies printed have all been sold, the demand is still not great enough to make the production of the paper worth while. If the orders increase considerably during the next few weeks "The Sailplane" may be continued, otherwise it will be dropped. At present the demand for a gliders' paper is evidently so small that "The Aeroplane" is fully justified in refusing to allocate several of its pages (which are read by tens of thousands of people) to the few hundreds who seem to be interested in gliding.**

## MANY INVENTIONS.

Like the rest of England, Croydon Aerodrome people stand aghast at the tragedy of the Airship R.101 and deeply mourn all those gallant men who died there on the hillside above Beauvais. Especially deep however is our grief at the loss of Air Vice-Marshal Sir Sefton Brancker and Sq. Ldr. Johnston, for they were both personal friends of almost all of us.

What Sir Sefton Brancker did for Civil Aviation and how he steered it through those dark and doubtful early days when every man's hand, especially that of the politician, seemed to be against Civil Flying, will doubtless be chronicled elsewhere, but what "the General" (as we affectionately, if incorrectly, called him) meant to Croydon Aerodrome as a community and to very many individuals connected with Civil Aviation can scarcely be put into adequate words, even by one who knew him and counted him as a friend for over a decade.

Many a private individual, many a manager and many a pilot took his doubts and troubles to Sir Sefton and came away with comfort, shrewd advice and inspiration derived from that vigorous optimism which was the keynote of the Air Vice-Marshal's character. What he did for various people and how he helped and inspired them will probably never be known and what he meant to us is perhaps best illustrated by a conversation between two of the oldest Croydon Aerodrome people who have been connected with civil flying from the commencement. These two, discussing the tragedy, said, almost with one voice, "We have lost the best pal men ever had." No name was mentioned—there was no need, for in each mind was a picture of a gallant energetic little man with a monocle.

The Guild of Air Pilots and Navigators has lost its Master and Vice-Master in one blow by the death of Air Vice-Marshal Sir Sefton Brancker and Sq. Ldr. Johnston, and their places will be hard indeed to fill. Sq. Ldr. Johnston was well known to us on the aerodrome and about him too there were invigorating tonic properties, for he had something of the same incurable optimism as Sir Sefton Brancker and the same faith in Civil Aviation. It is comforting to feel that both these men would have preferred to die in harness when their time came, and of them we can say with Kipling—

"For their work continueth
And their work continueth
Broad and deep continueth
Greater than their knowing."

Following the R.101 disaster the aerodrome was swiftly shaken from its stupor of grief and amazement, for every newspaper in London was clamouring for a special machine to carry reporters and photographers to Beauvais. Soon there was not a single aeroplane to be had for love or money (certainly not for love), and no less than 28 machines were on the aerodrome at Beauvais at one time on Sunday morning.

Another of these aeronautical gold rushes to Australia seems to have started, and for reasons which, though probably good, are somewhat inscrutable, a number of people have set off hurriedly to Australia within the last day or so. A Flt. Lt. Hill left Lympne in a Moth and flew to Budapest with the Antipodes as his ultimate objective, on Sunday morning at 06.00 hrs., and on Monday Messrs. Chabot and Pickthorne in a Puss-Moth departed from Croydon for Australia at 05.30 hrs. Meanwhile our old and esteemed friend, Bert Hinkler, sits quietly at home [or in America.—Ed.] with a two-year-old record (which is æons in aviation) and wonders, no doubt, why someone does not get a move on and beat his record, giving him a chance to have another shot at establishing a new one by beating theirs in his turn.

A new firm has sprung up in our midst known as Personal Flying Services Ltd. It is run by Mr. Kennedy, late of Walcott Air Lines, with Mr. Clark as pilot. The fleet consists of a Junkers and Sikorsky Amphibian (two Pratt and Whitney 300 Wasp engines), which Mr. Clark stoutly accuses of cruising at 105 m.p.h. Passenger taxi work is to be undertaken, and the firm specialises in conveying urgent freight, samples, machinery, motor-car parts, etc., to places not served by regular air lines. Such freight pays a specially high rate, of course, so there is no competition with the ordinary freight business of the air lines.

Mr. Percival, in his Hermes-engined Hendy 302, made a very fast trip to Cannes recently in five and a half hours, which is remarkably good going, with a passenger and suitcases. It means cruising at 120 m.p.h. They landed at Le Bourget, but did not refuel, as they carried petrol for 7½ hours. They did the return trip in 6½ hours.

Miss Winifred Spooner's new craft, the Desoutter Mk. II (inverted Gipsy) has been tested out during the last week and is now ready for delivery. Not only is the machine a first-class job in every respect, but it is a real lady's machine, from the point of view of being delicately coloured blue and silver, with internal upholstery, etc., to match.

On Saturday last, at the home of the Surrey Aero Club, the new Gatwick Aerodrome, near the racecourse, there was a well attended and excellently organised Air Pageant under the auspices of Mr. R. B. Waters, one of the late Col. Henderson's pupils. Mr. Jeffs was in charge of the flying, and, as usual in such cases, everything moved with faultless precision, and this we heard was also the case with the malt and spirituous liquors afterwards. Everybody seemed to enjoy Mr. Waters' well-arranged show, and people came away with the impression that at Gatwick Mr. Waters has an organisation which, together with the excellent situation of his aerodrome, should enable him to build up a big business before very long.

Considerable interest attaches to the activities of the Brant Aircraft Co., of which the directors are Mr. A. A. Sidney, our old friend, Mr. F. W. J. Grant, of Surrey Flying Services, and Mr. L. E. Baines, who was with the Aircraft Manufacturing Co. in the early days at Hendon and later with Short Bros. of Rochester. Mr. A. A. Sidney is the designer of a new compression-ignition heavy-oil engine called the Sidarblen, and the purpose of the Brant Aircraft Co. is to design and build an aeroplane around this engine. The Sidarblen was called after the three people who originally formed a company in connection with it, Mr. Sidney, Col. Darby and Col. Barratt-Lennard. The progress of this aeroplane and engine will be watched with the closest interest by all aviation people.—SPRY.

## A SOUTH AFRICAN DE HAVILLAND COMPANY.

The De Havilland Aircraft Co. Ltd. has formed an associated company in South Africa and this company will be known as the De Havilland Aircraft Co. (South Africa) Pty. Ltd., with head office and works at Johannesburg.

The De Havilland Company is certainly indulging in a constructive Imperial policy. The parent company now controls branch companies in Canada, Australia, India, and South Africa. As regards the rest of the World, licensees, selling and service agents for the D.H. Moth exist in twenty-five countries.

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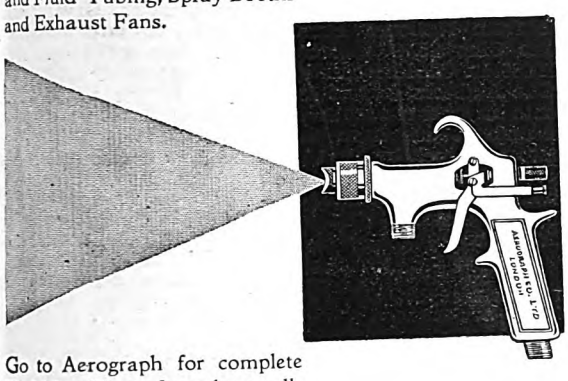

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## MRS. VICTOR BRUCE.

Mrs. Victor Bruce, in her Bluebird (Gipsy II), got away from Constantinople on Sept. 30. Her arrival there was reported in THE AEROPLANE of last week. She had trouble in the Taurus Mountains and a forced landing at Eski Shehr, near Angorkan. The next day a stormy passage ended in another forced landing not far from Konia, which Mrs. Bruce reached on horseback.

The Turkish Governor is reported to have been friendly and Mrs. Bruce mentions receiving a decoration from the local Air Force.

On Oct. 3 her arrival at Baghdad was reported and she made good progress down the Gulf the following day. She was observed passing Henjam at 13.15 hours on Oct. 5 and some hours later a wireless message from her machine reported a crash on the hills near Kohimborak, 20 miles North of Jask. She has, of course, been rescued.

## IN THE CITY.

By G. P. Kerr.

[This feature is intended to appear once in every Stock Exchange Account, and should be of interest to those who hold or intend holding investments in companies concerned directly or indirectly with aviation.—Ed.]

Contango days,—Oct. 6—20.

Account days,—Oct. 9—23.

There was quite a little flutter among a group of Stock Exchange men interested in the aviation share market when a young clerk rushed up with the news "There's going to be a new air issue." "Nonsense," was the reply, "*what* manufacturer is going to float now?" "There is," the clerk stoutly maintained, "a new Ayr Corporation issue for a million and a half!"

But apart from this momentary excitement, De Havilland shares have been the chief feature of the past account. At one time they could be sold at about 33s. 6d., but the price subsequently fell to below 30s., recovering rapidly to about 30s. 6d. Considering the comparatively small floating supply of these shares, the amount of business transacted was appreciable. It is said some ten thousand shares were sold from New York, and it was this (not the news that Matthews' Puss-Moth had come down in Siam) which lowered the price. Little importance is attached in the Market to the company's proposal to establish a new subsidiary for the sale of Moths in South Africa.

The fall in the price of Imperial Airways from 26s. to 20s. belongs to the history of the previous account. Since then there has been a little demand at around 20s. 6d.—21s.; and there have been small investors buying 50 and 100 shares. The publication of the full figures made a better showing than was first expected, and at the annual general meeting Sir Eric Geddes successfully enlisted the sympathy of both the shareholders and the public by his complaints—more or less justified—against the Inland Revenue and Post Office officials. The complaint may or may not have helped shareholders to forget that they are receiving 5% instead of 7½%.

In the rest of the Aviation Share Market very few dealings have taken place, and prices have fallen back through neglect rather than through any pressure of selling. Handley Page, for instance, opened the account at 12s. 6d. and drifted back to 12s., and Napiers, which were 11s., closed sixpence easier. There was no interest in Fairey Aviation Ordinary 10s. shares, but the Debentures kept steady at 99.

Rolls Royce Ordinary £1 shares changed hands below 40s., having begun the account at 42s. 6d. Here again New York selling helped to depress the price.

Petters (which own the Westland Aircraft Company) remain a steady and restricted market at 21s. 3d. Smith's Accessories had a big jump from 2s. 9d. to 3s. 9d. for the 1s. Deferred shares, and the 7% Preferred Ordinary shares were better at 31s. 6d.

The first accounts of the National Flying Services covering the fifteen months to July 31 last do not make a happy showing. A trading loss of £39,141 is revealed and there is also an item of £10,426, being excess of expenditure, including debenture interest over income prior to date of opening of Hanworth Park. The Company has an issued capital of £191,698 in Ordinary shares and there is in issue £154,375 of 7 per cent. first mortgage debenture stock. In the Balance-sheet intangible assets total £49,903, which with the debit to profit and loss account amount to nearly £100,000.

On the publication of the report the 2s. Ordinary shares were quoted in the market "nothing to sixpence"—no buyers.

Items in the assets include investments in and amounts due from National Petrol Services, and Yorkshire Aeroplane Club £6,797. Aircraft and engines at cost figure at £41,688 1s. 3d. less cost of units written off £3,331 9s.

The Auditors' report is "subject to the value of investments in and amounts due by subsidiary companies, and the amount due from the Nottingham Aero Club." The losses sustained by the two subsidiary companies have been carried forward in the accounts of those companies.

The annual meeting will be held on Oct. 14 at Feltham and the statement on the position will be made by the Chairman.

| | *Making up Price.* Sept. 22nd. | Oct. 6th. |
|---|---|---|
| De Havilland | 32/- | 30/- |
| Fairey Aviation | 10/6 | 10/- |
| Do. Deb. | 99½ | 98½ |
| Handley Page 10% 8/- Pref. | 12/9 | 12/- |
| Imperial Airways £1 fully paid | 21/3 | 20/6 |
| D. Napier | 10/6 | 10/6 |
| National Flying Services | 9d. | 4½d. |
| Petters | 21/3 | 21/3 |
| Rolls-Royce | 40/7½ | 40/9 |
| S. Smith & Son 1/- Defd. | 3/- | 3/9 |
| Do. £1 7% Prfd. Ord. | 31/3 | 31/3 |

## PERSONAL NOTICES.

### Deaths.

ARMSTRONG.—On Sept. 30, at Arundel, Sussex, as the result of a flying accident, Flt. Lt. Gerald Christopher Allan Armstrong, R.A.F.

Flight Lieutenant Armstrong passed out of the R.A.F. Cadet College, Cranwell, in December 1923. At Cranwell he was awarded the Sword of Honour, for the best all-round Cadet; and the R.M. Groves Memorial Prize, for the best all-round pilot in the Senior Term. He was also President of the College Debating Society. He was posted to No. 56 (Fighter) Squadron on appointment to a commission. He was promoted to Flying Officer in June 1925, and in November 1926 he was appointed Air Aide-de-Camp to the Governor of South Australia. In October 1927 he was posted to the R.A.F. Training Base at Leuchars, Fife. In May 1929 he was promoted to Flight Lieutenant and in May 1930 he was posted to the staff of No. 1 Flying Training School, Netheravon. He was posted to No. 17 (Fighter) Squadron on Sept. 1, 1930.

BIRKISHAW.—On Sept. 30, at Arundel, Sussex, as the result of a flying accident, Serjeant Wilfred Birkishaw, No. 17 (F.) Squadron.

CALWELL.—On Sept. 27, result of motor accident, Flg. Off. Alexander Kirk Kennedy Calwell, son of the late Capt. and Mrs. A. McD. Calwell, Belfast.

### Forthcoming Marriages.

HEALY—BURGESS.—The engagement is announced between Flt. Lt. Ernest Alton Healy, R.A.F., elder son of John E. Healy, M.A., barrister-at-law, and Mrs. Healy, of 47, Pembroke Road, Dublin, and Helen Hamilton, elder daughter of the Rt. Hon. H. G. Burgess, P.C., LL.D., and Mrs. Burgess, of Eglinton House, Kingstown, Co. Dublin.

MOODY—WATSON.—The engagement is announced of Miss Ellis Joan Watson, daughter of Lady Samman and step-daughter of Sir Henry Samman, Bart., of Cottingham, to Mr. Brian E. Moody, R.A.F., son of Dr. and Mrs. C. H. Moody, of Ripon.

SPRECKLEY—TEAGUE.—The engagement is announced between Mr. Herbert Dorman Spreckley, R.A.F., only son of Mr. and Mrs. A. H. Spreckley, of Ashley Down, Bristol, and Winifred Emery, youngest daughter of Mr. F. N. Teague, J.P., and Mrs. Emery Teague, of Worcester.

### Births.

PARRY.—On Oct. 4, at Ridge House, St. George's Hill, Weybridge, to Joan, wife of Wing Cdr. Rex Parry, D.S.O., R.A.F.—a daughter.

RIDDLE.—On Sept. 29, at a nursing home, London, to Doris, wife of Flt. Lt. C. B. Riddle, R.A.F.—a daughter.

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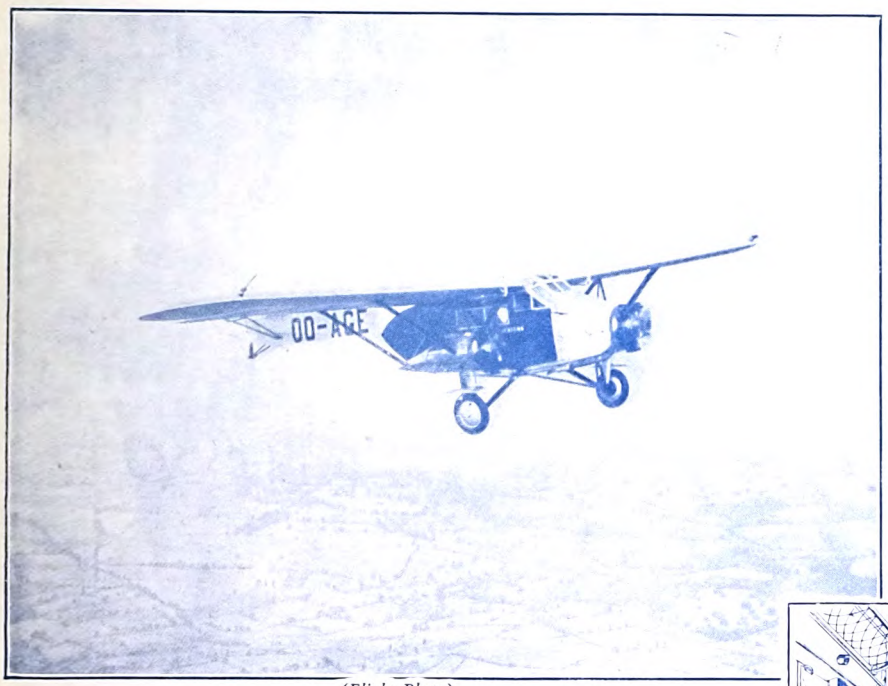


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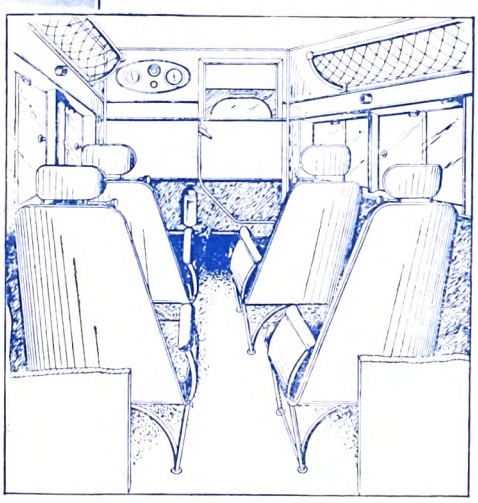

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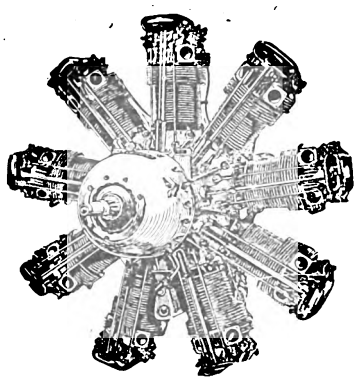

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# THE AEROPLANE

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INCORPORATING AERONAUTICAL ENGINEERING
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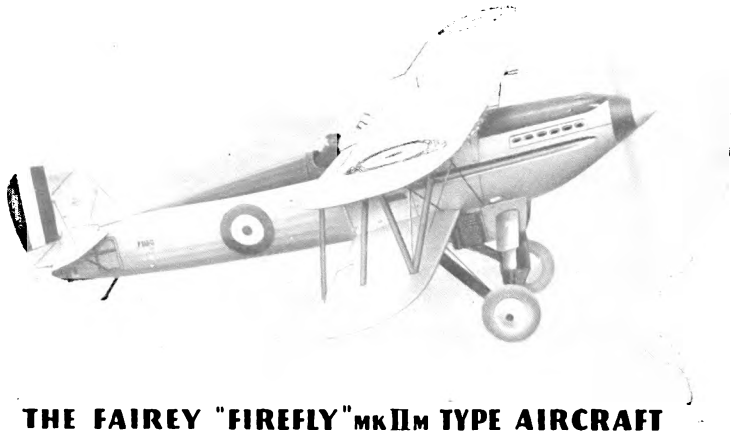

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forty-nine council meetings out of fifty,—and he added that this was not a precedent which would be followed. As the head of a great industrial concern Mr. Fairey cannot reasonably be expected to equal such figures. And the Royal Aeronautical Society is to be congratulated on the fact that Colonel Sempill, with all his various engineering interests, has not been so tied to any one of them as to be prevented from attending meetings of the Society.

The good which Colonel Sempill has done for British Aviation has by no means been confined to presiding at Council meetings or other meetings of the Royal Aeronautical Society. He has been equally valuable in the combined proceedings of the four bodies which represent British Aviation, namely the Royal Aeronautical Society, the Royal Aero Club, the Air League and the Society of British Aircraft Constructors. And whether he has been presiding at one of their great combined banquets or at meetings of the R.Ae.S., he has always said the right thing in the most tactful way at the right moment.

In his official capacity Colonel The Master of Sempill has been notably helped by his wife. The Honourable Mrs. Forbes-Sempill is the daughter of Sir John Lavery the famous artist, and she has all the ready wit of her Irish ancestry coupled to a sense of humour which is not by any means Irish. Her tact and charm must have helped materially to bridge over difficulties when conflicting or hostile elements have had to be brought together on public occasions. And all who have met her during Colonel Sempill's term of office will hope that his resignation from the Presidency will not mean that in the future we shall see less of her and her husband at future gatherings.

Mr. C. R. Fairey, who now takes over the Presidency, is one of the most remarkable men in this country. He is only forty-three years of age and in the past fifteen years, starting be it noted at the age of twenty-eight, he has built up one of the biggest aircraft concerns in the World. And for two years he was an outstanding success as Chairman of the Society of British Aircraft Constructors.

Moreover the size of the Fairey Aviation Company is no indication of its importance to the British Empire. The outstanding fact about the firm has been that whatever may have been the policy of the Air Ministry, and no matter how delayed or misguided the specifications which governed the placing of contracts for war machines may have been, the Fairey Co. have always produced in the emergency just the particular kind of aeroplane that the Air Force has wanted at that particular moment.

For example, by judicious adaptation of American ideas Mr. Fairey produced for the R.A.F., without any obedience to Air Ministry specification, a two-seat fighter called the Fox which was superior in performance to any of the contemporary single-seaters. He built the sample machine purely as a commercial speculation, though he adhered rigidly to A.I.D. rules and Air Ministry stress requirements, and it was so superior to anything else of its time that the Air Ministry could not refuse to buy it.

Also for years the Fairey IIID. and later the IIIF. have been doing the general all-round duties of the Air Force over land and over sea, on wheels and on floats, although none of them has ever been put in for any of the Air Ministry Competitions.

Mr. Fairey has treated the manufacture of aeroplanes as a thoroughly commercial undertaking. He has seen what the market wanted, he has produced it as a business proposition, and the market has been compelled to buy.

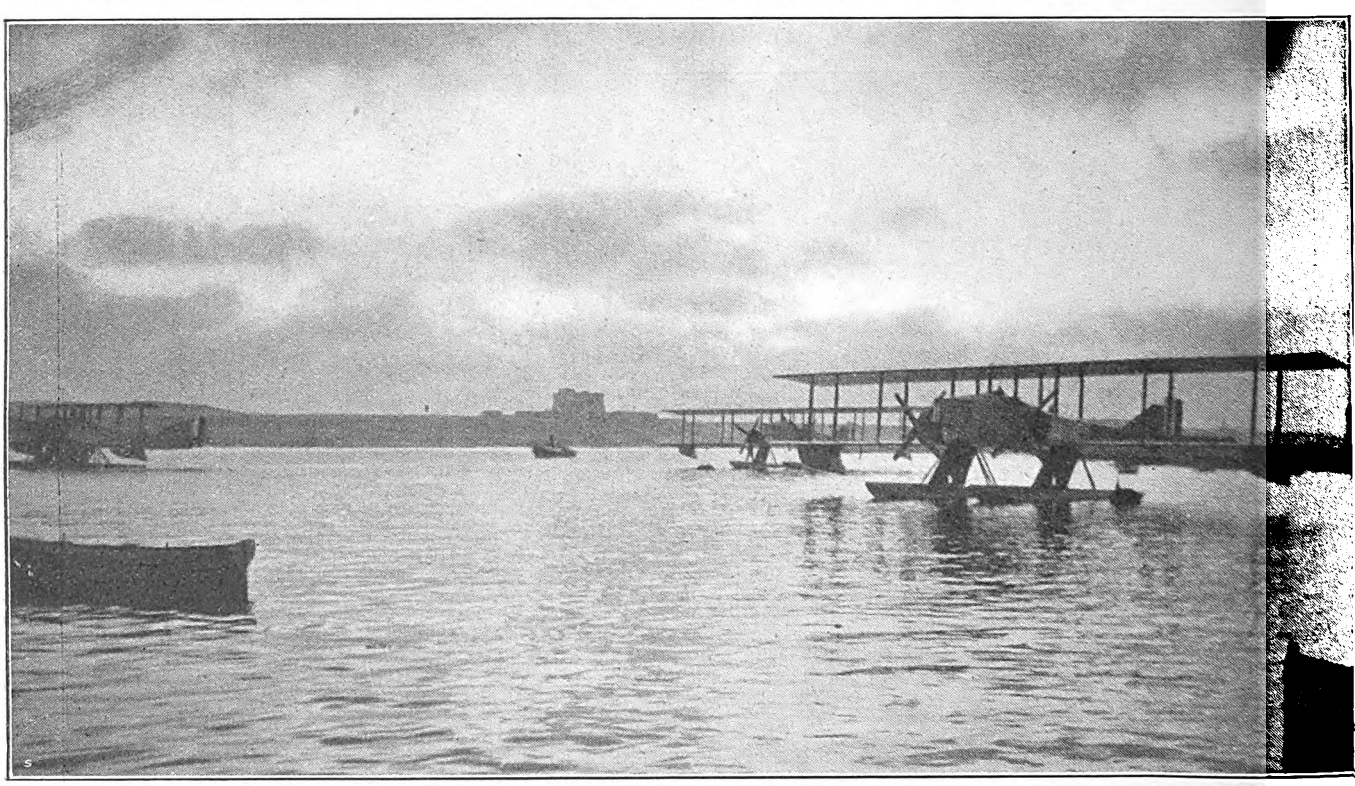
We can only hope that in due course, when Mr. Fairey is convinced that there is a market for civil aircraft, he will be equally successful in gauging the needs of the market and will produce aeroplanes which will make their name all over the World as his war machines have done.

In the meantime no better man could be found as President of the Royal Aeronautical Society. Mr. Fairey emphatically denies that he is a scientist or a mathematician. But one has known him to defeat eminent scientists and mathematicians by knowing just about as much as they know themselves and tying them down to substantiating their statements or their calculations. Therefore no spurious scientist is likely to have much chance of advertising himself at the expense of the Royal Aeronautical Society while Mr. Fairey is in office

As a practical engineer Mr. Fairey probably has no superior in this country or any other. Anybody who has had anything to do with Fairey aircraft knows that as engineering structures they are very difficult to criticise. And there is none quicker than is Mr. Fairey to recognise the value of anything new which is introduced to the engineering community.

He is not a pilot, but if an aviator is one who flies he can certainly claim to be an aviator. And, as the looker-on often sees most of the game, the passenger is very often a better critic of a pilot than another pilot would be. Certainly several of our most successful pilots owe their present eminent positions to Mr. Fairey's judgment of what does and does not constitute a first-class pilot.

With these qualifications Mr. Fairey combines a sound business instinct, a very keen sense of humour and the ability to express himself in an impromptu speech. Some day perhaps he may take to politics,—and then Parliament will be considerably enlightened. Till then the Royal Aeronautical Society will benefit greatly by having him as President, for C. R. Fairey does not take on any job unless he knows he can make a success of it.—C. G. G.



A MALTA HARBOUR.—Three Farman Goliath seaplanes of the French Air Force moored out on Sept. 26 at Marsascirrocco, Malta, during a cruise from Bizerta to Beirut. The Flight was escorted by two French destroyers throughout the cruise, which was an experimental one. The pilots were Lieutenants de Vaisseau **Lecroix, Hébrard, and Lanry.**

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## THE GROWTH OF AVIATION.

On Oct. 9 Mr. C. R. Fairey, M.B.E., F.R.Ae.S., President of the Royal Aeronautical Society for 1930-31, gave a lecture on "The Growth of Aviation." This was the Inaugural Lecture of the 66th annual session of The Society, and was given at the Royal Society of Arts.

As this was the last appearance of Colonel The Master of Sempill as President of the Society, a post which he has filled with distinction for so long a time, many came to express their appreciation of the services which he has rendered. The hall was quite full. The lecture was a fitting reward for those who came with such a laudable object, and the lecture had so much good meat in it that we hope THE AEROPLANE will enable many more to appreciate the very heartening opinions which Mr. Fairey holds as the result of a careful examination of all the data which he has been able to collect.

The proceedings were opened by Col. The Master of Sempill, who said that he spoke under the stress of considerable emotion both because we were still under the shadow of the disaster at Beauvais and because it was the last occasion on which he would address such a Meeting as President of The Society.

He said that we had lost not only people who were of the greatest possible importance to the British race, but many intimate friends, and The Society had lost some of its most brilliant technical members. There was no doubt that those who had died would wish that we should carry on. He then quoted that passage from *Ecclesiasticus* where it is written, "All these were honoured in their generations and were the glory of their times."

The Society stood in silent tribute while the President recited the names of those members who had died.

He next recounted very briefly the history of the Society from its early start in 1866 to present times. After this he introduced the new President, Mr. C. R. Fairey, with some biographical remarks anent his age, his early skill at kite-flying and model-making, and then his achievements at Short Brothers which he left to found the Fairey Aviation Company in 1915.

### THE LECTURE.

Mr. Fairey opened his lecture by accepting as the commonest of platitudes the fact that Aviation is now in its infancy. He says therefore that to take stock of its growth, and to ascertain whether the rate of growth is being maintained, is not unbecoming in conscientious parents or guardians. He admits that he has entered upon a very ambitious project in endeavouring to present a picture of the world-growth of Aviation and makes no pretence that his figures are other than broad approximations based on such data as is available coupled of necessity with estimates in certain cases.

As the subject is far too big to be dealt with adequately in a single paper Mr. Fairey has only attempted to present a condensed summary along broad lines and is thereby forced to ignore altogether many aspects of the question.

Figures which are officially certified as accurate are easily attainable for Technical Progress. In civil operations most leading transport companies publish figures of mileage, of passengers, of goods and of mail carried. In most cases subsidy figures are readily obtainable.

In military aviation most of the Great Powers make public the sums voted for this purpose. In some cases one can get the numbers of machines available and on reserve. Soviet Russia does not take the World into its confidence on these questions, but the general belief is that its Air Force ranks in size with those of the Great Powers.

Mr. Fairey then says that growth must be defined and explains that he proposes to consider it under the three heads of technical, military and civil aviation.

Statistics, particularly when not fully complete, can be highly misleading. They may be quite accurate but the impression they convey may be entirely artificial. For example, if one were to consider the figures of capital employed in Aviation as symptomatic of its growth in any one country we might consider the case of America over the last few years.

The colossal expansion of the private capital invested in the eight leading companies of American Aviation, most of whose shares have no par value, from 338 to 775 million dollars can hardly be held truly to represent a growth of Aviation. It represents for the most part a growth of optimism on the part of the investor. It does not accurately represent output, stock, work in progress, or material assets.

Therefore attempts to portray the growth of American Aviation by the mere consideration of the figures would obviously be misleading. A similar case would be the jump in output for the same period, but a great many of these machines are still unsold. The annual returns of miles flown can be equally misleading. For an unsubsidised company which operates on a paying basis over a small mileage shows more growth than millions of miles flown with a constant unit of subsidy per mile.

Mr. Fairey considers that, contrary to general belief, the period of the War 1914-18 was not one of great technical progress. [This agrees exactly with what THE AEROPLANE has been arguing for many years.—ED.] World figures for this period are not available, but if they were, would only produce a bulge in the curves which would be largely offset by the corresponding slump afterwards. The aftermath was represented by a vast stock of superfluous machines. Some of these were exported to other countries, some converted to civil use and a great many merely subsided into obsolescence. He therefore disregards this period altogether and examines the Growth of Aviation without it, except as regards its effects on the starting points of the post-war period.

One hundred years ago there was nothing of aviation in the World except a few scientific models and some writings. When the Society was formed 64 years ago a few model aeroplanes existed and two or three full-sized machines had been built or projected. About thirty years after the formation of the Society, experiments on the lines of those which ultimately proved successful were being pursued in four of the countries which have now become prominent in the development of Aviation.

Even then less than a dozen men were directing these experiments which led a few years later, on Dec. 17, 1903, to the first accredited flight by man.

The number of persons directly interested did not exceed 100; and as several scientific workers and other persons were showing a mild interest, the total forces of Aviation at that time might be put at not more than 200 persons.

### TECHNICAL PROGRESS.

We have ample and accurate data in the official World's records for estimation of the growth of technical progress. Starting from 1903 to the present day in 27 years the record for Distance in a Straight Line has been increased from 852 ft. to 4,912 miles, the record for Duration has grown from 59 secs. to 67 hrs., the record for Altitude has climbed from just clearing the ground to over 43,000 ft., and Speed has gone up from about 30 m.p.h. to 357 m.p.h.

These records must some time reach a limit. That for Altitude has already exceeded any heights useful for civil or presumably military purposes, as it is far above the height at which man can live without artificial aids to respiration and maintenance of temperature. The pursuit of this record has had, and will continue to have, however, a most useful effect on the design of aircraft, and particularly in the development of superchargers for aircraft engines.

The record for Speed must soon begin to slow up in its rate of growth. As we approach the speed of sound the rate of variation of resistance with speed will depart from the law of $V^2$ and will begin to rise until it reaches a ratio where the resistance varies as the 3rd or some higher power of the velocity. This fact would appear to provide a very formidable barrier. If power can be found to accelerate through this region the resistance falls off again until it varies, he believes, with the $V^2$ law again.

Natural laws may be expected to set definite limits in similar ways to the growth of Duration and Distance Records. Although the growth of Aviation as measured by technical records may have come a great deal of the total way on present lines, yet we have a record of continuous and steady growth up to the present time. If the present rate is maintained for the next ten years we can expect to see aeroplanes which will travel at speeds of 500 m.p.h., which will maintain themselves for over 100 hrs. on the load they have lifted, and will fly nearly 8,000 miles non-stop in a straight line.

Mr. Fairey then turns to the research and educational sides of technical growth. He outlines the history of such growth, which may be said to have started with the formation of the Advisory Committee for Aeronautics set up by the British Government and the Eiffel Laboratory in France. The National Advisory Committee for Aeronautics was not started in the United States until 1915.

After considering the large number of educational establishments which provide a thorough training for aeronautical work, Mr. Fairey draws attention to the stupendous increase in the membership of the Royal Aeronautical Society which has grown from 150 to over 4,000.

### MILITARY AVIATION.

The expansion or decline in Military Aviation is in response to the political tendencies of the World. But Military Votes have provided, and still provide, the bulk of the funds which have made possible the technical and commercial growth of modern aviation. Until the last few

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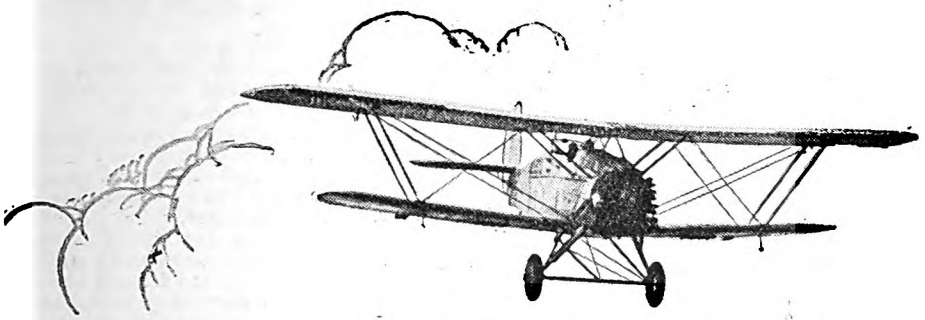

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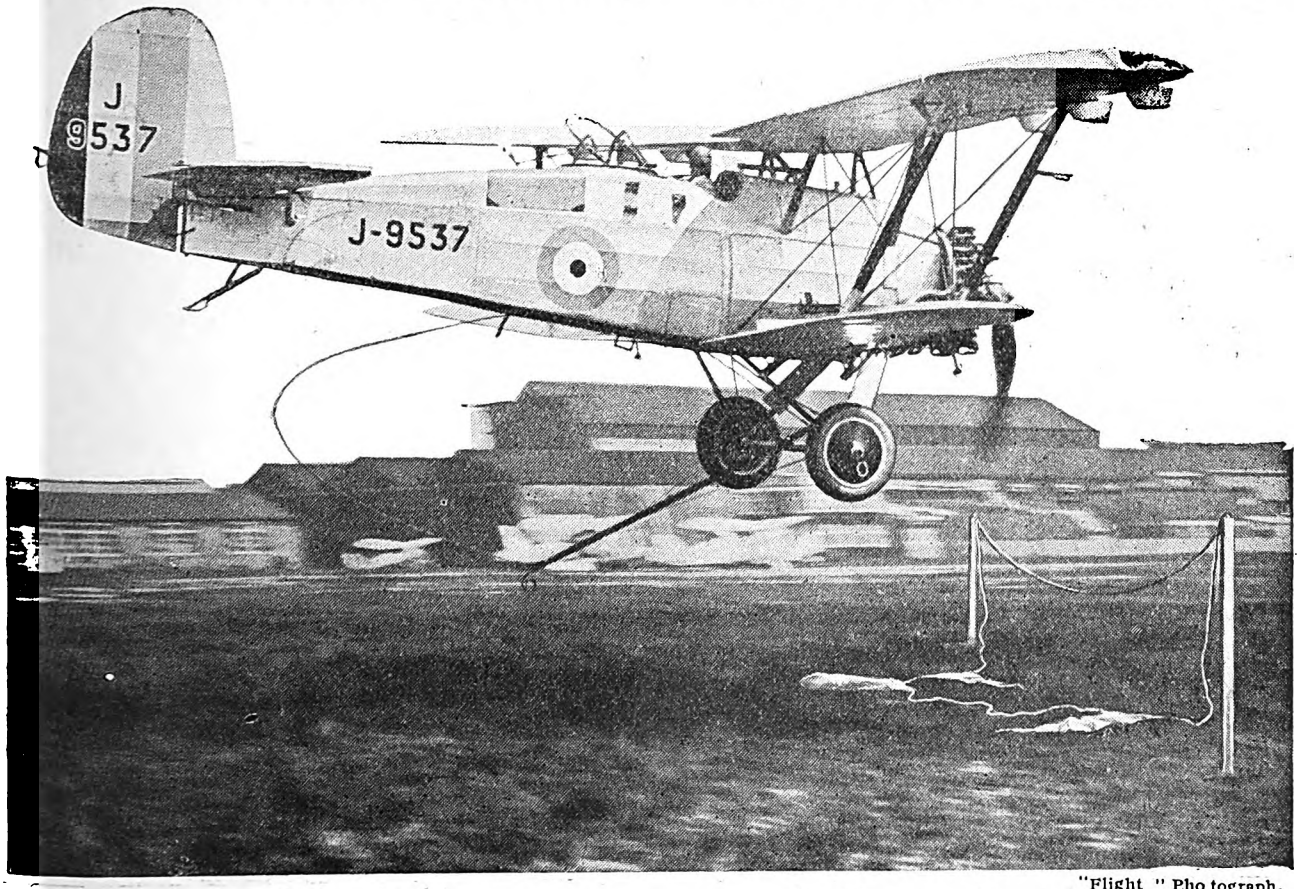


"Flight" Photograph.




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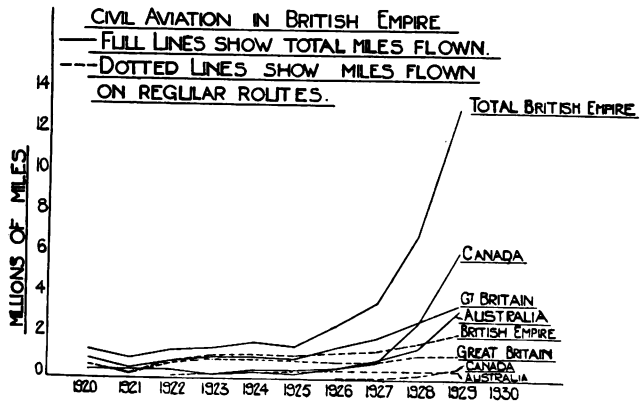



years when an independent civil industry has come into being, Aviation as a whole had been entirely dependent on military requirements.

There are certain difficulties in measuring Military Aviation by comparing the expenditure. For example the total British Vote includes money for the policing of the Near East, it includes sums for the support of Meteorological and other services of general utility to all Aviation and for research and contributions to the N.P.L. It also includes money for the support of the A.I.D., on which falls a great part of the burden of maintaining the efficiency and reliability of British Aircraft. Moreover the figures for British Military Aviation show a slight reduction since 1925, although since that period military aviation in this country has advanced enormously.

On the whole, in terms of the expansion of civil aviation, military aviation is growing very slowly and the rate of growth is apparently declining. If military votes are maintained at their present level a greater proportion of such sums will be spent on research and other services. A computation for 1929 gives a total sum of military votes equivalent to £86,000,000. A similar estimate for personnel gives a total of 125,000. [Here we may add that French personnel cannot be estimated, because so much work which is done by R.A.F. personnel, such as guards, fatigues, transport, etc., is done by the French Army.—Ed.]

### Civil Aviation.

Civil aviation dates only from the end of the War 1914-18, if one excepts the activities of the pioneers. About ten years ago many enteprises were launched unassisted to inaugurate the air routes of the World. Some of these, notably those run by the late Mr. Holt Thomas and by Mr. Handley Page, made good progress towards a commercial basis.

To-day a large proportion of the regular air routes are subsidised or helped but as the figures will show, commercial aviation throughout the World is making steady progress towards independence. Private flying and unsubsidised concerns which have had only a few years' existence are making the most rapid advance of anv.

Mr. Fairey takes as one of the best indications of progress the total mileage flown. Great Britain shows a steady and nearly uniform growth for the past few years and reaches a total of nearly 3,700,000 miles in 1929, of which roughly 1,200,000 is on regular air routes.

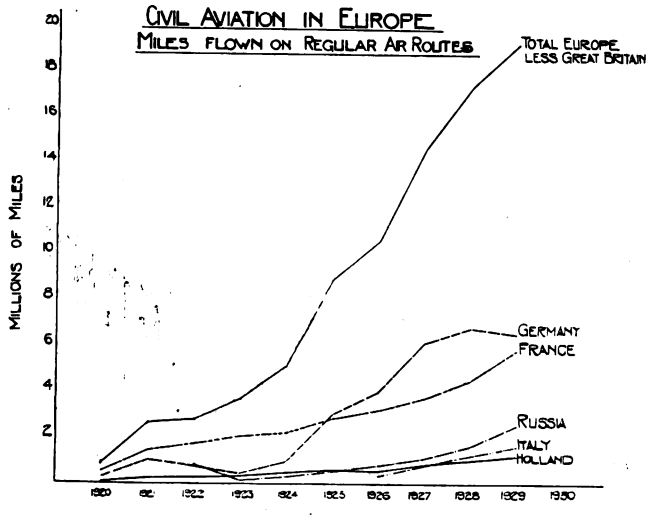
Australia, which started with less than one-third of the British mileage in 1922, had practically equalled it by 1929 and reached a total of nearly 3½ million miles, of which 478,000 was on regular air routes.

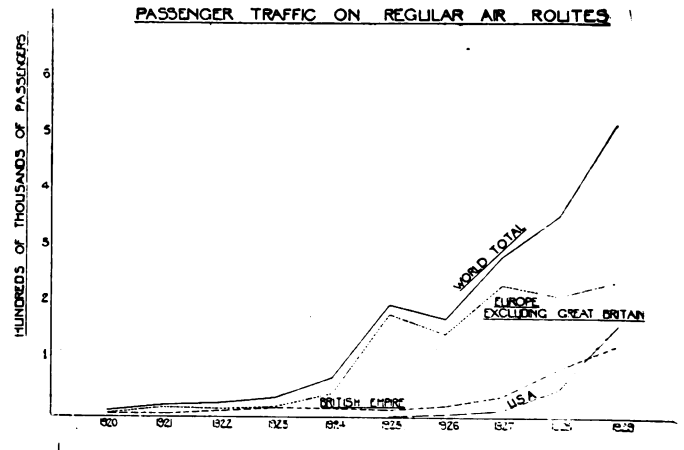
Canada, with less than 200,000 miles in 1923, did not pass Great Britain's total until 1928, but nearly doubled it last year, when a total of 6,284,000 miles was reached. Of this 491,000 was on regular air-mail routes. An estimate gives about 1,450,000 miles flown on organised routes, including air-mail operations. In the charts the figure for regular air transport mileage is that of air-mail only.

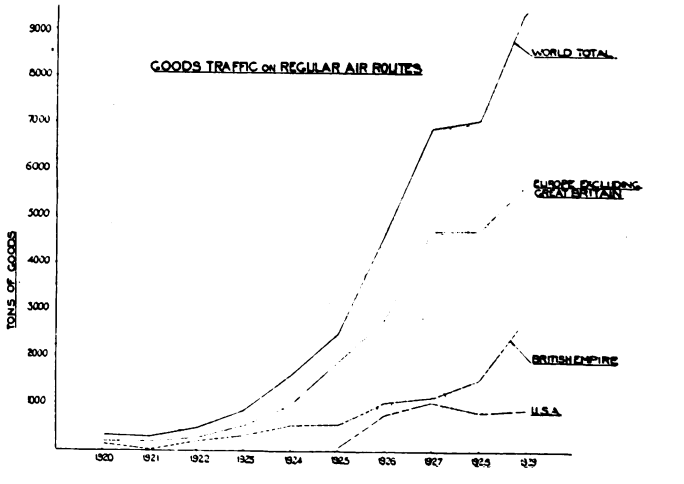
It is in these three countries that the bulk of Civil Aviation in the British Empire takes place. The outstanding fact is the very rapid expansion in Australia and Canada in the past two years. In these two countries the rate of growth was no greater than in the rest of the World until 1927. From that time the rate of expansion in them is far higher than anywhere else in the World except the U.S.A.

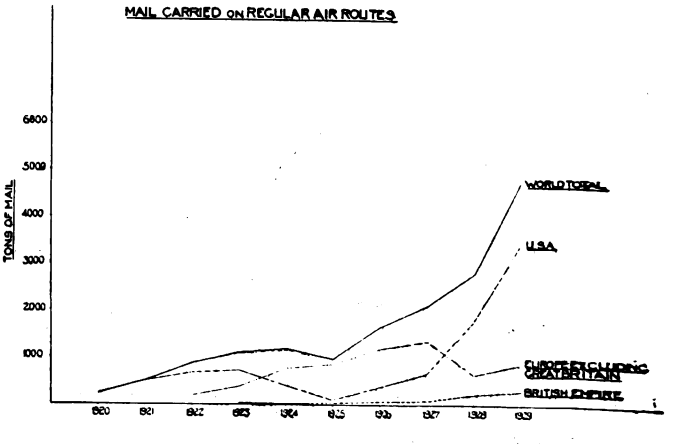
This growth is due to flying on other than regular air routes, which show a slow but steady growth. If one takes Britain, Australia, and Canada together, the present ratio of total to regular air route flying is about 6 to 1. If one takes Canada and Australia together the ration is 10 to 1, provided that only the subsidised air-mail mileage of Canada is counted. The curve for the British Empire as a whole shows the influence of Australia and Canada. The total flying for the Empire by the end of 1929 was over 13,000,000 miles.

Mr. Fairey then turns to Europe, where because of the

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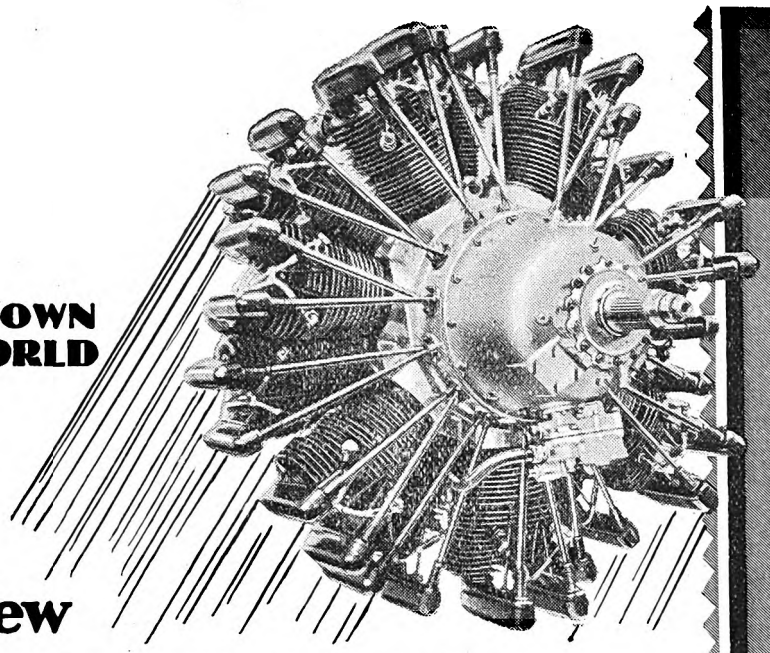

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lack of data on private flying and other services, he has been able only to take the regular air routes. In any case the private flying and other services would be small in comparison with the British Empire or the U.S.A.

The curves for Europe show mostly a slow but steady growth, though Germany actually shows a slight decline. The total figure for all is just over 19,000,000 miles and all on regular air routes.

### America's Lead.

In America statistical data are available for total flying over the past 8 years and for regular air routes over the past 10 years. The results are certainly remarkable. By 1929 20,000,000 miles was flown on regular air routes alone. The estimated total of commercial flying other than on regular air routes in America for the year ending 1929, is 104,000,000 miles.

Mr. Fairey explains that he was very careful to check this figure in every possible way. He compared it on the ratio of hours per machine, and the ratio of total to subsidised air routes, with the similar figures for Australia and Canada. These checks force him to conclude that these figures are fair. Thus the total mileage for American flying was 150 million miles for 1929, which is an increase of 375 per cent. on 1928, and a figure equal to 80 per cent. of the total flying mileage of the World.

The curves for total flying in America, Canada and Australia show a marked similarity. There was a steady growth up to three years ago, a decided increase for 1928 and then this rapid expansion in 1929. This expansion is not in subsidised or regular air route flying but is in various flying services and private aviation. [Mr. Fairey says he did not underline it, but The Aeroplane does. *These curves would appear to indicate very decisively the fields of aerial activity of the future and the market for the aviation industry.*—Ed.]

He next considers the World total of which these three countries form by far the greater proportion. South Africa is only just starting and may be expected to show development equal to other countries which have the same conditions.

In this World total Mr. Fairey assumes no private flying whatever in countries other than the British Empire and the United States. This curve shows the same general shape as the American, Australian and Canadian ones. But both the total flying and that on regular air routes show a regular expansion and increasing rate of growth for the whole World.

Excluding military flying the total World mileage at the end of 1929 was 189 million miles, all computed from published data which we know are not complete. Twenty years ago he estimates the World total at 10,000 miles.

### Subsidies.

Mr. Fairey next considers the subsidies paid between 1920 and 1929 for the five principal subsidy-paying countries. Subsidies on the whole are increasing slightly. Great Britain shows only a slight increase from £200,000 in 1921 to £360,000 in 1929 and £448,000 for 1930-31. This includes the sums which have been paid for the opening-up of new routes.

Italy shows a somewhat sharper increase and France a more rapid one still, with a value between three and four times the British total. Germany is apparently the only country where the amount paid in subsidy is definitely decreasing. Although the curve for mileage flown is decreasing it does not fall as rapidly as the amount of subsidy paid.

In dealing with the subsidy figures Mr. Fairey explains that although the amount paid in American Air Mail Contracts was £3,630,000 in 1929, only £206,000 was represented as subsidy for that year. He takes this figure because it is the difference between the amount the American postal authorities paid the transport companies and what they themselves received from the public for franking the letters.

On the total mileage curve Mr. Fairey has also plotted the total subsidies for the corresponding period. These reach a figure of nearly £5,000,000 for last year. From these curves the cost for flying on regular air lines may be computed. In 1920 the figure was 5s. 4d. In 1921 matters were worse and a mile cost 5s. 9d. From that time there has been a steady improvement which appears to indicate an approach to a commercial basis. In 1925 air lines cost the World 3s. 4d. a mile and by 1929 this figure had dropped to 1s. 11d. For the purpose of comparison the same figures may be taken over the total mileage of the World which gives a cost of 6d. a mile.

Mr. Fairey gives a list of aircraft operators in the British Empire who work without a subsidy. In Great Britain there are two air survey companies, one engaged in aerial photography, six flying schools, five flying clubs, one sky-writing and crop-dusting concern, nine air-taxi and twelve joy-riding concerns. In India there are one air survey and one air transport firm. In Australia there are ten air transport companies with a route mileage of 4,240 miles, four air-taxi and six joy-riding concerns. New Guinea has three firms engaged in air transport.

Canada has an imposing list of ten air-transport firms, thirteen air-taxi and prospecting concerns, two schools, two forest-survey companies, three engaged in photography and sixteen joy-riding companies. There are six flying clubs in South Africa. All these operate without subsidy.

The curves of passenger-carrying do not show quite the same characteristics as those of World-flying. Within the British Empire 16,500 passengers were carried in 1923 as compared with extremely small beginnings in 1920. The figure remains nearly constant until 1926 when the upward tendency starts and by 1929 British Empire Air Routes were carrying 128,000 passengers, or 25 per cent. of the World's totals.

Passenger-carrying in Europe, if we exclude Great Britain, has expanded hardly at all in the last two years, and is just short of 250,000. In the United States the rate of growth is extremely rapid. In 1928 the traffic was little more than half of that in the British Empire, by 1929 it exceeded it by 30 per cent. The totals for the World show the effect of American and British increases. In 1929 over a half a million people were carried on the regular air lines of the World.

A total of 9,000 tons of goods was carried by air in 1929. Of this figure Europe carried 60 per cent., the British Empire 30 per cent. and America was the lowest with only 10. With regard to mail, the situation is reversed. America dominates the situation with 72 per cent. of the total carried and the British Empire takes lowest place with only 6 per cent.

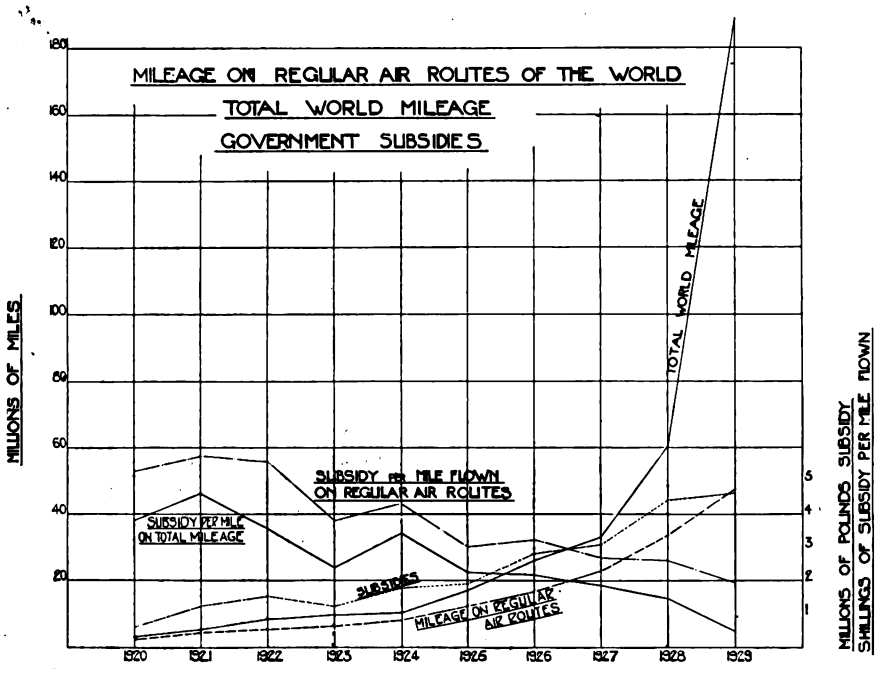
Mr. Fairey draws the conclusion that the growth of Civil Aviation throughout the World was slight and variable to 1927 with a marked advance from that time.

### The Aircraft Industry.

During the War 1914-18 the Aircraft Industry reached colossal proportions but the subsequent slump must have reduced it to very small proportions indeed. The aircraft industries of the World are still largely supported by the military vote but there is every indication of the growth of a separate civil industry.

On the Continent with the exception of Germany and Holland the industry is nearly entirely dependent on Government contracts and export. Germany has no war industry at all but the Civil Industry receives considerable support, and is in effect as dependent on Government assistance as most other countries and more so than some. The number of firms has increased slightly.

In England 70 per cent. of the firms depend on Government contracts but 20 per cent. of the total turnover is

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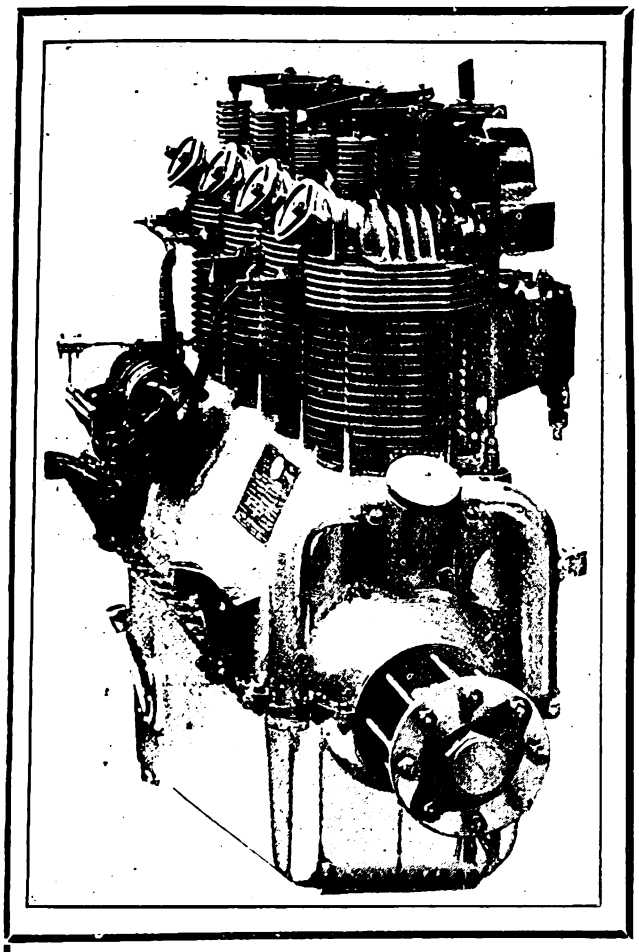

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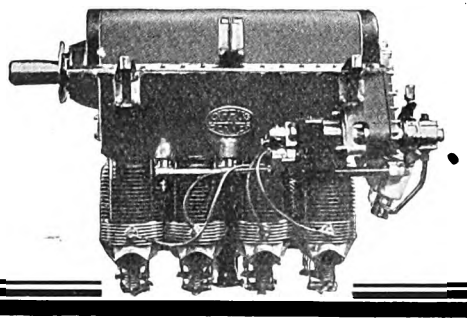




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purely civil aviation. Exports of complete machines and engines, civil and military formed last year 15 per cent. of the whole British trade. Purely civil firms have increased noticeably in the last two or three years in England.

In America the Civil Industry has far outstripped the military. In Italy the number of firms has remained constant for four years. The apparent decline in French firms for the past few years is due to the grouping of the industry.

In the countries which have been mentioned 169 firms are engaged in aviation. Mr. Fairey regrets that he has been unable to collect figures which would gives the World total of the annual output of aircraft. He guesses that in 1929 not less than 10,000 machines were produced. The total export turnover for the World for 1929 is £6,600,000.

Summing up, Mr. Fairey first reminds us that we must make all allowances for the weaknesses of statistics as such and of the danger of using them for purposes of prophecy. In spite of this it is obvious that Aviation is growing, and growing very fast. In technical achievement the advance proceeds apparently unchecked though this rate of progress cannot be maintained for ever.

Military aviation is but growing slowly in amount, however much it may be achieving in efficiency. But civil aviation is proceeding triumphantly. The regular route mileage throughout the World is growing and the subsidy per mile is falling. As a result Aviation is nearing a true commercial basis. Other forms of flying, mostly unsubsidised are advancing tremendously and this advance is nearly all within the British Empire and the United States.

Mr. Fairey thinks that the potentialities of Canada, Australia and America are the most marked features which have been brought out by his survey. In these countries and others similarly situated would appear to be the greatest opportunities of Aviation.

From its small beginnings early in this century Aviation to-day has covered a distance of nearly 200,000,000 miles and this without counting military aviation. On scheduled services alone over half a million passengers, nearly 10,000 tons of goods and nearly 5,000 tons of mail are carried annually. Its industry is capitalised at nearly £100,000,000 and employs 70,000 people. Yet the civil side of that industry is but beginning.

Mr. Fairey closes by saying that the root causes of this growth of aviation are still with us, and certainly not less to-day than in the past. So it would appear that Aviation is indeed in its infancy and with an incalculable future before it.

In conclusion, Mr. Fairey remarked that this was the first meeting since the retirement of Colonel Sempill and he would not like the occasion to pass without making some remarks on the work which the retiring President had done. He said that many telegrams of congratulation had been sent to Colonel Sempill, but he proposed to read only one, and that was from the Prince of Wales.

As he was in a statistical mood he would give some figures about the career of the past President. The most striking ones he quoted were perhaps those which illustrated that the Society had had for its President a great pilot, who had flown 3,000 hours, in 150 different types of machines and covered 250,000 miles by air. His last trip had been a 2,000-mile tour round the Baltic.

He drew attention to the fact that the tremendous rise in membership of the Society had coincided with the period of office of the retiring President and said that this could not be entirely a coincidence. The successful amalgamation with the Institution of Aeronautical Engineers had also been due to his diplomacy. He had taken the chair at 79 out of 80 Lectures, and attended 49 out of 50 Council Meetings. He added that this latter was a precedent that would not be kept.

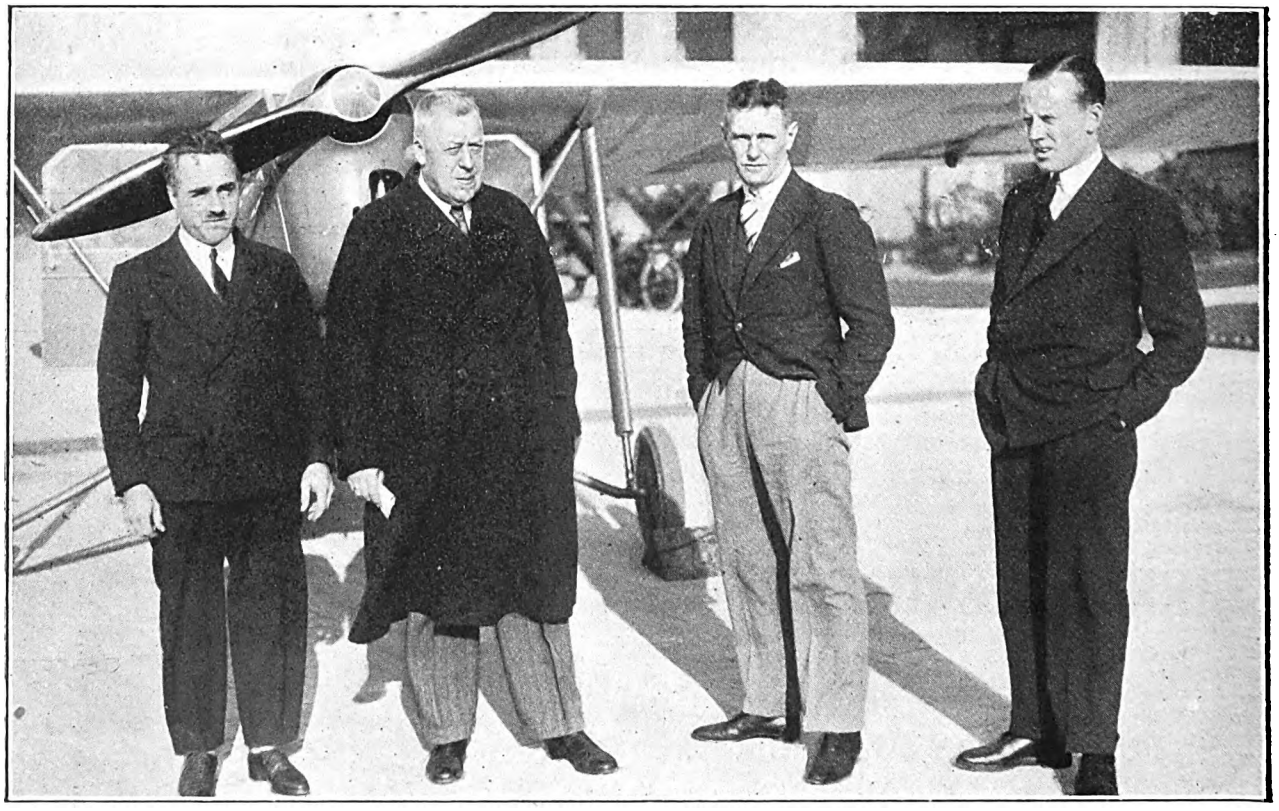
### Envoi.

When Mr. Fairey had finished, Colonel Sempill said that the paper was one of absorbing interest, and the matter which it contained should go far beyond the realms of the Society. We had all wanted such information, but it was not generally available. He mentioned the energy, ability and untiring zeal which Mr. Fairey had brought to the production of his paper and thought it an auspicious omen for the Society.

He suggested that the Meeting should adjourn without discussion, as a mark of respect to those who had lost their lives. He proposed a vote of thanks and called upon a Vice-President, Lt.-Col J. T. C. Moore-Brabazon, M.C., to second it.

Colonel Moore-Brabazon said that the occasion was one on which he proposed to pay a tribute to the retiring President. There were certain disadvantages in following a good President in that he created a precedent. Mr. Fairey had our sympathy in having to follow Colonel Sempill. He reminded the Meeting that the Society was a scientific one and hoped that no one would try to make political powder and shot from what they had just heard.

Things were different in this country from what they were in the United States; the difficulties were further increased by the fact that the British Empire was not one geographical chunk. He thought that the steepness of the curves had shown we were at a crisis; he asked that we might have the same lecture again in ten years' time when all the curves had flattened out.



**INTERNATIONAL COURTESIES.—Herr Doktor Eckener at Croydon before leaving in a Desoutter for Holland to catch the night train to Germany. Left to right: Mr. Marcel Desoutter, Doktor Eckener, Mr. Styran (pilot), and Colonel the Master of Sempill.**—(*"Aeroplane" photograph.*)

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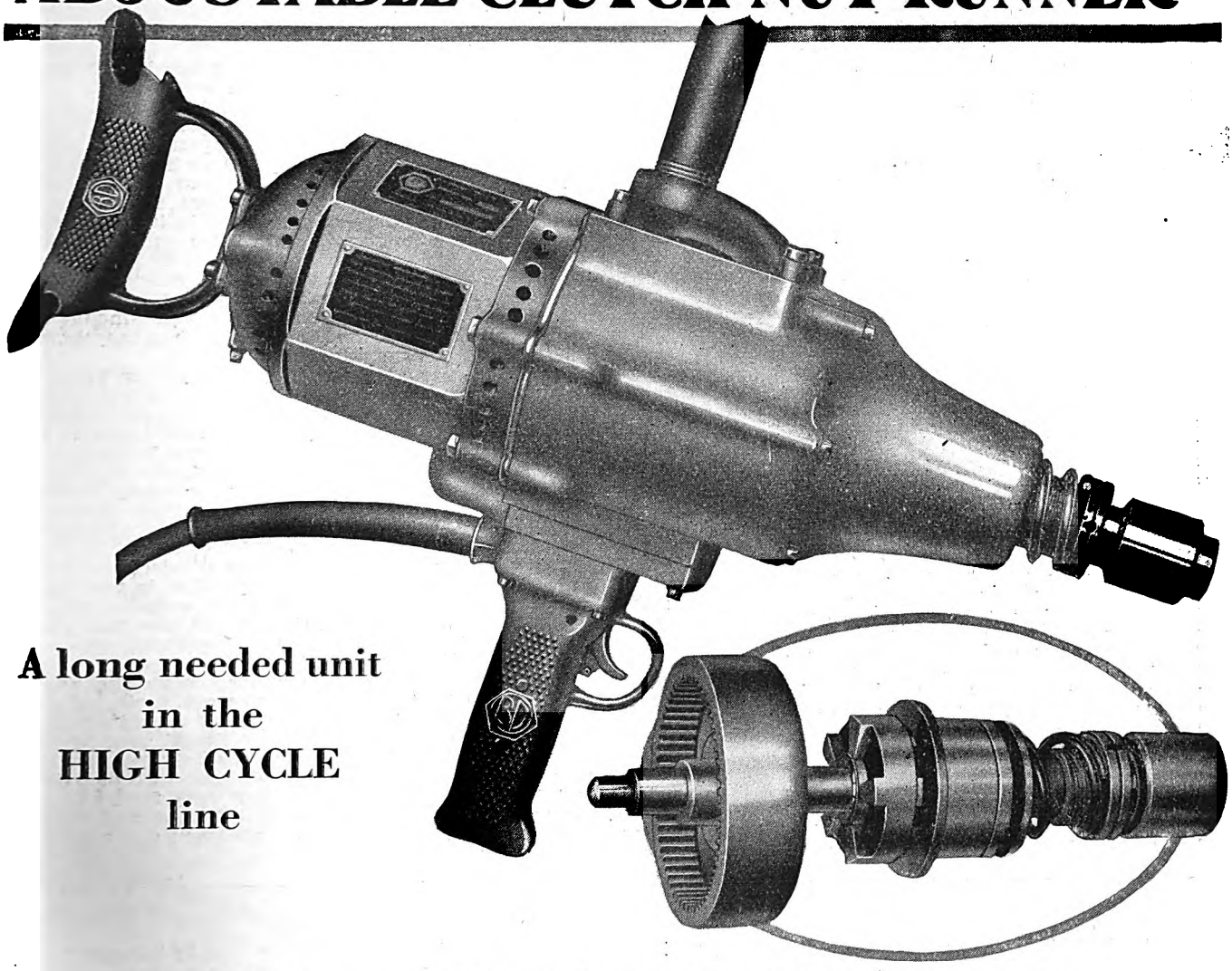

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## ON A PSYCHOLOGICAL PROBLEM.

Mass psychology is an unaccountable thing. Many of us who have been concerned with aeronautical affairs since the early days are puzzled by the amount of public interest which has been shown in the accident to R.101. Naturally we are glad that our friends who died doing their duty should have a proper Service funeral, although doing civilian duty when they were killed. But we cannot feel that any honour was done to them by making their coffins a public show, even though it was called "lying in state."

The friends of the dead, or those who had had to do with them or their work, might have been admitted to St. Stephen's Hall or to the cemetery at Cardington to pay their last respects. But none can believe that all those thousands who trooped past the coffins were moved by any such feeling. A glance at the photographs in the papers which showed sections of the queues does away at once with any such idea. The fatuous faces, many of them grinning at the camera, show the typical idle curious folk, nearly all women, who have nothing to do but seek sensation after their morning house-work is done—the products of the middle-class and lower middle-class London suburbs, —the sort who mob Society weddings or other free raree show which may be boosted by the cheaper papers.

Personally, if I had been one of the victims my soul would have loathed having all those vulgar sightseers gazing at my coffin—always provided that my soul had not yet come to that complete understanding which is able to explain all things. And just because we do not understand all things we may believe that there was a purpose in this exhibition of the dead. One does not suggest a deliberate human scheme for purposes of propaganda, but God moves in a mysterious way His wonders to perform.

Why should all this excitement have arisen? We do not hold memorial services in St. Paul's, nor have two-minute silences at professional football matches, nor close the windows of totalisators (curiously dissonant methods of showing respect or grief) whenever an oil-tank steamer catches fire and burns up her crew, or whenever a tramp sinks with all hands, or whenever a colliery explosion destroys thirty or forty hard-working men in the course of their duty.

No national memorial service was held, and there was no lying in state and there was no public funeral after Air Commodore Ned Maitland, one of the best and bravest of men, and some forty British and American officers and men died when R.38, burst asunder in the midst over the Humber. We do not hold an annual memorial service, with an appropriate pageant, in memory of the forty or fifty officers and men of the Royal Air Force who are killed in the course of their duty each year,—even though many of them are killed by their own foolishness, these also would still have a right to a part in such a service. There are many other equally good objects for which we might mourn collectively and nationally, and do not.

As Mr. Harold Nicolson pointed out so delicately in his broadcast talk last Friday, there was no particular heroism in being a member of the crew of R.101. The ship was certified officially to be airworthy—and, incidentally, nothing has suggested that she was otherwise. Every man in her was keen to go and was full of confidence and was envied by dozens of others who would willingly have gone instead. And practically every man had travelled in other airships which definitely were far more dangerous than R.101—such as R.38 and R.33. So though we have cause to mourn good friends and useful workers we have no cause to mourn dead heroes,—for, as Mr. Nicolson indicated, a hero is only one who goes through with his job in a state of fear, or bodily anguish. Where there is no fear there is no bravery. And a martyr is not necessarily a hero.

Yet the fact remains that the feelings of the British Public have been moved as they have never been moved by any other aeronautical accident. Does this indicate that to-day the British Public is more interested in air affairs than it was when R.38 broke in the air,—or, in the more popular phrase, is the Public more air-minded than it was?

If so, those who died in R.101 have not died in vain, for if public interest is so great as it would seem, then we cannot let the work of these martyrs be wasted. We must go on with the building of other airships.

A writer in *The Observer* on Sunday argues in favour of delaying further work on airships till we have learned more about such aircraft from the American ships which are now being built. That is a false argument, for the American ships are enlarged Zeppelins, and are built on a principle from which the designers of both R.100 and R.101 entirely disagree.

We have our own designs, which are essentially English. The men who did the actual designs of both ships are still alive. And they have acquired a vast amount of experience which can be used at once. In fact they have new and improved designs actually in hand.

Everybody who has ever designed anything knows that long before the thing which he has designed has been built he has thought of many ways of improving his designs and only wishes that he could pull the whole thing to pieces and start afresh. The production of both R.100 and R.101 was delayed for months because the designers kept on making alterations in the light of their increasing knowledge. And to-day we could safely lay down a couple of new ships in the certainty that they would be vast improvements on the existing R.100 and the late R.101.

There is one seemingly reasonable objection to going ahead with such work immediately,—that is the inherent danger of using hydrogen in such new ships. That objection is futile, because those ships would take two years at least to build, and if we set to work properly we can put up a plant to make helium in our Canadian oil-fields and get all the helium we shall want long before the ships are ready to use it. The United States got their helium for the *Los Angeles* and for all her little airships in just about a year. There is no reason why we should need two years.

New and improved airships are the only possible decent monument which we can set up to those who died in R.38 and R.101. So let us set about the work forthwith, while the memory of those martyrs is still vivid and while the experienced designers and skilled workmen and workwomen are still gathered together.—C. G. G.

## THE BROTHERHOOD OF FRANCE.

By kind permission of the Editor of *The Times*, we have the privilege of publishing the impressive account which appeared in that paper of the honour done by the French Republic to the dead of R.101. No words can adequately express the gratitude of the Aeronautical Community of Great Britain for the way in which our French Allies showed how this catastrophe united us all in a common brotherhood of sorrow.

Boulogne, Oct. 7.

The coffins lay in state in the Town Hall at Beauvais all night watched by gendarmes, soldiers, and four Red Cross nurses. Each was covered with the Union Jack, and the large room in which they lay was so full with flowers that the coffins were almost hidden and the guards were faint with their perfume. There were wreaths from the British Government, the British Ambassador, the Royal Air Force, the Royal Navy, the British Army, the French Government and Services, and many others from the town of Beauvais and neighbouring villages, from all the local ex-soldiers' and other associations, from the French Red Cross, and from individuals. Early this morning the public were allowed to file through the main entrance to the Town Hall, past the open door of the mortuary. Thousands of people passed in a steady stream. Some made the sign of the Cross in the doorway: others threw single flowers into the room or stepped out of the ranks to lay wreaths or bouquets over the coffins.

In the meantime the troops who were to honour the dead were mustering in the great square outside. Two battalions of the 51st Infantry Regiment made a wall of horizon blue, topped with steel helmets and flashing bayonets, in front of the Town Hall. Facing them, opposite the main gateway, was a Colour party with the Colour of the Regiment uncased and wearing the Cross of the Legion of Honour and the Croix de Guerre. The band of the regiment stood close by, and, near them, a detachment of the French Marines in their seamen's dress, and a section of gendarmes with sabres bared. Along the sides of the square, most picturesque of all, two squadrons of Spahi cavalry, magnificent in their flowing robes, sat their fidgeting chargers waiting for the word to move. French military, naval, and air officers gathered in groups, and, a little to one side of the square, a detachment from the naval airship base at Orly stood at ease. All the Services were present.

Soon after 10 o'clock the gates of the Town Hall were closed and the official personalities began to arrive. Lord Tyrrell, representing the King and Queen, wore full diplomatic dress, and Air Chief Marshal Sir John Salmond, who had flown from England, was in uniform. The United States Air Attaché in Paris, Major Walsh, represented his Government and brought a wreath. The Belgian Air Attaché was also there. M. Tardieu, the Prime Minister of France, and M. Laurent-Eynac, the Air Minister, arrived together a little before 11 o'clock. The greatest interest was caused by the appearance of three survivors of R.101—

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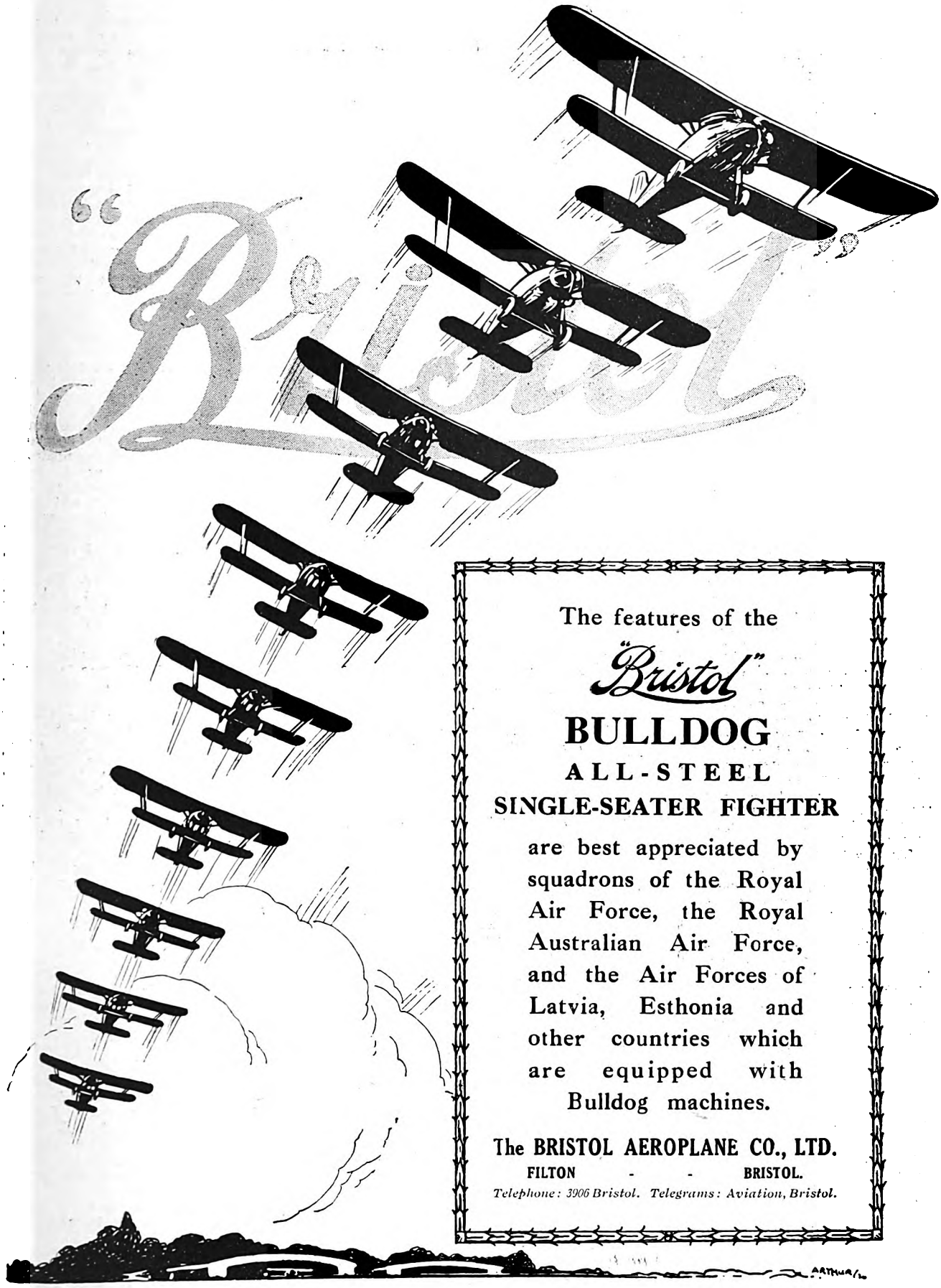




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Messrs. Leech, Binks, and Bell—who were to walk in the procession. All three were hatless and dressed in the clothes they were wearing when the airship crashed, and Mr. Leech had thick bandages on his head and on one hand. They faced the crowd and the photographers a little more nervously, perhaps, than they had ever faced the air. Indeed, the *sang-froid* of the survivors and their fine spirit are the admiration of their many French friends.

Nothing was left undone for the honour of the British dead, and one minute before 11 the first muffled boom of a salute of 101 guns broke the waiting silence. Twenty-three army wagons, each drawn by four horses, had been collected and loaded in the inner courtyard, and as the Town Hall clock struck 11 the first wagon moved out through the gate. A flourish of trumpets — "Aux Champs!" — called the troops to the salute; it was followed by "God Save the King" and the Marseillaise. As the music died away the roar of aircraft filled the air, and flight after flight of French war machines — Nieuport-Delage fighters and Breguet XIX reconnaissance machines —soared overhead.

Wagon after wagon—there seemed to be no end to them —appeared in the archway. Each contained two coffins and a mass of flowers. A wagon with a single coffin came last.

The procession slowly got under way, moving round three sides of the square. First came a company of gendarmes in their blue-and-black uniforms, gold-braided képis, and white gloves. Then the band of the 51st Infantry Regiment, playing a Funeral March; the Colour, and the Infantry. After the soldiers came the Beauvais firemen, who had vainly fought the flames of the R.101; next came a section of soldiers carrying wreaths, and then the coffins. Eight French soldiers, with arms reversed, escorted each wagon. Here and there a French flying officer walked at the head.

Directly behind the coffins and making a pitiful contrast to the numbers of their dead comrades, came the three survivors. Leech's bandages conspicuous in the sun. Colonel Langlois, commanding the Beauvais Garrison, followed, with M. Joly, the Mayor of Beauvais. Behind them Lord Tyrrell, Mr. Wedgwood Benn, Secretary of State for India, Mr. Montague, Parliamentary Under-Secretary of State for Air, Sir John Salmond, M. Tardieu, and M. Laurent-Eynac walked abreast, followed by all the members of the Investigating Commission and the French and British officials. Then came a long succession of French civilians and ex-soldiers, Girl Guides, and nuns, with here and there the banner of an association. More infantry and the Marines and Spahis ended the procession. The station was decorated with French flags and Union Jacks, draped with crêpe. A train of nine empty vans stood in a siding. The wagons with the coffins drew up in a long line facing the train.

The troops marched through to the far end of the yard, wheeled about, and marched past the coffins at the salute. First the gendarmes; next the Colour; then rank on rank of shining bayonets and horizon blue. The rhythmic clash of the French drums and the flourish of the glorious French trumpets went on and on, beating down the guards of men's hearts with their poignancy. The blue collars and red pom-poms of the Marines made a note of fresh colour in the watery sunshine. Last of all, a moving cloud of Spahi cavalry, wild dark faces, blue and white cloaks and high white turbans, swept past. The band wheeled into place and followed the procession away in silence, and the pageantry was over. The British Ambassador, officers and officials took their places on a platform facing the train to receive the farewells and condolences of the French Ministers and representatives, who filed past and shook their hands.

Then the vans were loaded, closed, and their doors sealed, and they were coupled to a special train of four coaches, in which the official party travelled. It was a quarter past one before the long train drew out of Beauvais Station. The Mayor and Council of Beauvais and Allone, the local ex-soldiers' association, and about 100,000 people from Beauvais and elsewhere, massed about the station, waved a last salute.

The British travellers in the train looked back gratefully at the historic town, quiet and grey, in its nest of trees. They had been through an experience which none of them will ever forget. Rarely indeed can there have been such a deep and spontaneous movement of sympathy between two great nations. Since British soldiers in their millions fought and suffered on French soil the population of these northern departments has held the friendly nation across the water in grateful memory. Everything which kindness and warm feeling could suggest was freely given to the victims of R.101, the survivors, and their countrymen. In the small village of Allonne, where the bodies of the dead found their first shelter, every man and woman, from the Mayor to the poorest peasant labourer, made his contribution to the common tribute. They gave up sleep and leisure; they volunteered to watch the coffins through the night. Everything they could give was freely offered. The French Government and the fighting Services vied with the French citizens in service to strangers in distress and in homage to the foreign dead. Lord Tyrrell, speaking to the representatives of the London Press this morning, gave expression to the boundless gratitude of his countrymen and asked that it should be worthily made known. Everything imaginable, he said, had been done, and every wish had been met before it could be expressed. It was a wonderful and a very moving demonstration of good will.

### AT BOULOGNE.

The funeral train traversed a mournful landscape towards the sea. Here and there, along the line, groups of people waited to see it pass. Station staffs lined up bareheaded on their platforms. As we drew near the coast heavy clouds rolled in from the sea, as though England were throwing a misty pall over the Channel. In the British Military Cemetery at Etaples—the largest in France—the Union Jack flew at half-mast.

The train moved slowly through the streets of Boulogne towards the Marine Station. The town was in mourning. Flags flew at half-mast on buildings and on the shipping in the harbour. The quays were black with people, and human clusters in masts and cranes. The Prefect of the Department, the Sub-Prefect, the Mayors and Councils of Boulogne and Calais, the military and naval authorities, members of the Bar, and representatives of every branch of the town's

### REQUIESCANT.

(*R.*101.)

Giver of all we have and are,
Give us to know our numbered days
For that we stand not in amaze,
Nor vex Thy judgments from afar,
Or be such gift beyond Thy will.
Give us the less we may endure:
The faith that holds our footsteps sure:
The strength to suffer and be still.

Steadfast to stand in this belief
(They using other speech blaspheme)
Thy hand smote not across our dream,
Nor for a vengeance loosed our grief.
Needs not quick life nor dying breath,
Nor witness from the outer void;
Thine ancient promise, undestroyed,
Shall overlast the lesser death.

So slight these makings of our span;
The babe: the youth: the circled life:
The little hour of child and wife:
The day's desire: the morrow's plan:
The moment's mirth: fame's instant spark;
Each furrowed task the daylight fills:
The rose in bud: the brooding hills
So dear to leave: and then,—the dark.

But those, inviolate of change
(Whom, from this dust, we name our dead
Since by their hands uncomforted),
Their spirits sought the wider range:
They burst the chains dimension binds:
They rode the clouds for their emprise:
They rapt the secrets from the skies,
And laughed their challenge to the winds.

All faith, all wonder, all design,
All age-long skill their hands renewed,
They wrought, perfecting: and ensued
All boon of bench or loom or mine,
Nothing as they that work for hire,
And least alike that strive for fame;
Careless of question or acclaim,
Silent they framed their hearts' desire.

Which to achieve, no wearied sun
Nor watching stars, their strength denied;
Unto this last they testified;
All faith, all duty, bound in one.
Then . . . our belovëd slept . . . To know
Their triumph writ their testament
Past change or shadow: onward sent
Forever while the four winds blow.

Such telling, for their splendid sake . . .
For those bereft, the numbing years
Can sing no message for their tears,
There are no words for hearts that break . . .
. . . Yet upward, past the tangled loom,
Look to the skies of their delight,
And to the stars that set their flight,
And sight their glory through the gloom.

G. DE H. S.

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**LONDON.—The funeral procession passing up Aldwych. The Air Ministry buildings in Kingsway are seen in the background**

life waited at the station. The Colour, the band, and a company of the 110th Regiment were massed on the quay. Troops, presenting arms, lined the platform. Here and there a Tricolour banner rose from the dark mass of the crowd. As the train drew in, the forts fired a salute.

The destroyers *Tempest* and *Tribune* lay alongside the quay. The tide was dead low, and the tips of their funnels were level with the quay's edge. A broad carpeted gangway ran from the platform to the waterside. On the right of this a guard of honour of British bluejackets stood with arms reversed. The White Ensign and the flag of the Boulogne branch of the British Legion, dipped in salute, swept the ground side by side.

The doors of the van were thrown open, and the band struck up the Marseillaise, followed by the British National Anthem. Then the long task of placing the coffins in the ships began. Squads of firemen carried them from the vans across the quay. Here they laid them, one by one, on a cradle, and a crane swung them over the quayside and lowered them to the deck of the nearer destroyer. Bareheaded sailors carried them to the gun platforms of the ships, where guards were mounted. The great wreaths were set aside, to be heaped round the coffins when all were embarked, but the wilted bouquets of wild flowers and chrysanthemums which the peasants of Allonne and Beauvais had laid on the coffins were not disturbed.

It took an hour to carry the 47 coffins from train to ship. The band played funeral music, while the falling dusk slowly blotted out the people on the farther shore. The crowd stood patiently to the end. The three survivors stood a little apart, looking on sadly; and suddenly one of them —Bell—was overcome and collapsed, pitching forward on the platform. He was quickly carried away and recovered himself in a few minutes.

At half-past 5 the last coffin left French soil, and as it did so another salute crashed from the forts. It was now nearly dark, and from the blurred shapes of the destroyers the flags and flowers on the coffins stood out sharply under electric lights. The ships had to wait a little longer before they could go to sea.

They slipped away quietly soon after half-past 7 in pouring rain.

## THE MEMORIAL SERVICE IN ST. PAUL'S.

A Memorial Service to those who died in the R.101 was held in St. Paul's Cathedral on Oct. 10.

His Majesty the King was represented by H.R.H. the Prince of Wales.

The Dean of St. Paul's, the Archdeacon of London, Canon Alexander and other clergy of the Cathedral officiated at the Service and the Lesson was read by Air Commodore the Rev. R. E. V. Hanson, O.B.E., M.A., K.H.C., Chaplain in Chief of the Royal Air Force.

The Congregation, which filled the Cathedral fully, included representatives of all the Embassies and Legations of Foreign countries in London and many Foreign representatives who had travelled to England to be present. It also included the Civil Authorities of the City of London, whose robes were a brilliant patch of colour among the almost universal black.

All the members of the Cabinet who could possibly be present were there and those who could not were represented.

The Delegates of the Imperial Conference now in London attended.

The Board of Admiralty, the Army Council and the Air Council were strongly represented.

The Government Departments, Naval, Military, and Air Commands and all the Aeronautical Societies were represented.

Under the dome were the great company of relatives of the dead, many of them women and children whose courageous bearing throughout the ordeal of this great public service was worthy of the men whose memory the Nation had assembled to honour.

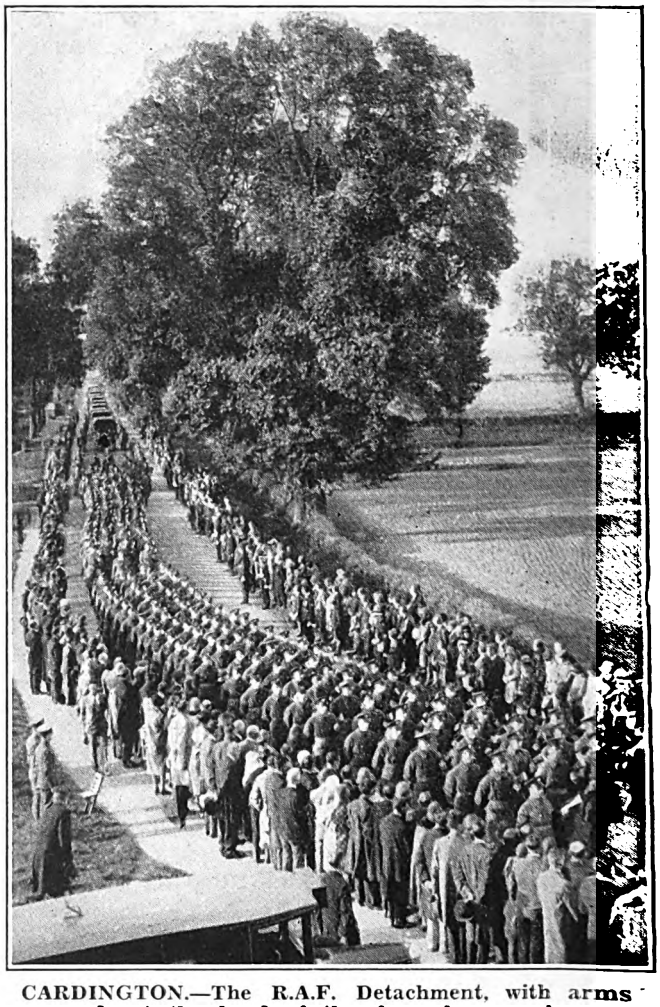
On the High Altar was the Royal Air Force Ensign which was flown by the airship on its last flight.

The Service ended with the sounding of "Last Post" by trumpeters of the Royal Air Force.—C. M. MCA.

## THE FUNERAL.

The bodies of the forty-eight officers and men who lost their lives in the R.101 disaster were buried with military honours in a common grave in the churchyard at Cardington on Oct. 11.

Throughout the previous day they lay in state in West-



CARDINGTON.—The R.A.F. Detachment, with arms reversed, at the head of the funeral procession at Cardington.

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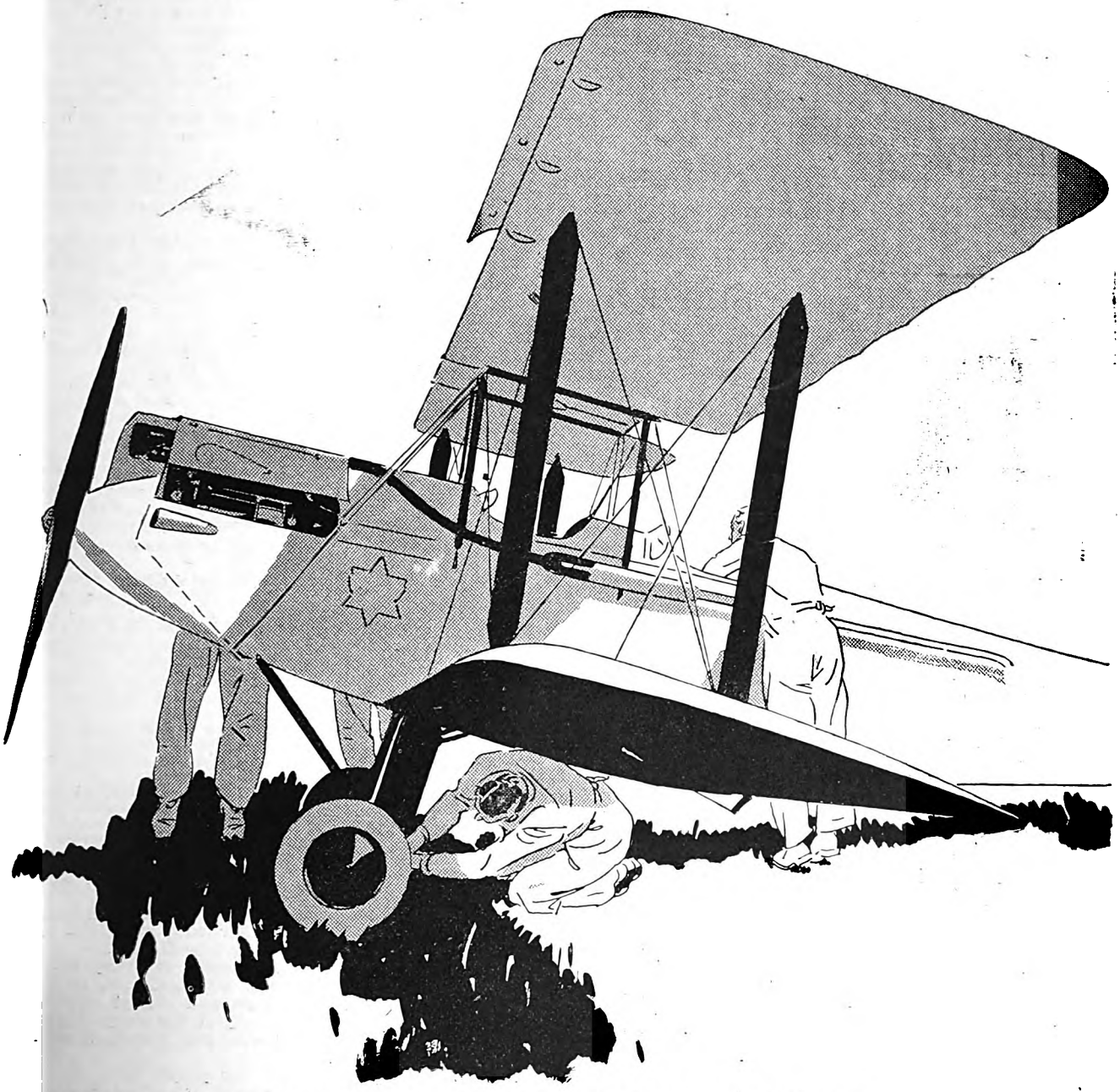

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# GIPSY MOTH



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minster Hall and in the morning of the day of the funeral they were borne through the streets of London to Euston Station and thence by train to Bedford and in R.A.F. lorries from Bedford to Cardington. There the funeral service was read by ministers of the Church of England, the Roman Catholic Church, the Presbyterian Church and the Wesleyan Denomination.

The funeral procession was headed by a detachment of the Royal Air Force followed by the band of the Royal Air Force. In London the coffins were carried in Army waggons and the second half of the procession was headed by a detachment of the Grenadier Guards and the band of the Welsh Guards.

In the procession were representatives of the Cabinet and of other official bodies in the United Kingdom, the Dominions, and representatives of Foreign Powers.

## A FRENCH TRIBUTE.

Our valued contemporary *Les Ailes*, of Paris, has published the following touching tribute to the martyrs of R.101 as its leading article:—

Ce n'est pas seulement l'Angleterre qui est en deuil, mais toute l'Aéronautique. La catastrophe horrible dans laquelle disparaissent de si hautes et de si nombreuses personnalités de l'Aviation britannique touche tous les gens de l'Air. Tous les gens de l'Air, quels qu'ils soient, où qu'ils soient, ont douloureusement pris part au malheur qui frappe l'Aéronautique anglaise et, dans sa peine, ont communié avec elle.

Le désastre est immense. Le dirigeable R.101 représentait un effort considérable, persévérant, qui méritait le succès. Que la voie soit bonne ou mauvaise, qu'importe. Avec foi, avec confiance, des hommes avaient conçu, réalisé le grand navire aérien qui devait promener le pavillon de leur pays sur les terres et les mers du globe. Avec un courage rare, avec une volonté tenace, ils avaient voulu que l'Aéronautique allemande ne fût plus la seule à détenir le secret du dirigeable et opposer à une technique dont Zeppelin jusque-là avait l'apanage, une autre technique, essentiellement anglaise. Nobles mobiles devant lesquels on ne peut que s'incliner. Le destin n'a pas permis que la réussite couronnât cette œuvre, bein digne de la tradition britannique.

Le R.101 n'est plus qu'un pauvre amas de métal tordu. Dans la chute, cinquante hommes sont morts. Et quels hommes! Ceux qui, précisément, conduisaient à sa destinée l'Aéronautique anglaise. Lord Thomson, Ministre de l'Air, Sir Sefton Brancker, Scott, Richmond, O'Neill, disparaissent dans la catastrophe. A leurs côtés sont tombés, plus de quarante hommes, héros obscurs, trop nombreux pour que le nom de chacun puisse être retenu mais que nous grouperons, pour toujours, dans notre pensée émue.

Tous ceux qui ont ainsi péri, au champ d'honneur de la conquête de l'air, ont été les bons serviteurs de leur pays, de sa gloire, de son prestige. Mais ils ont été aussi les apôtres d'une belle idée pour laquelle ils sont morts. A ce titre, le deuil de l'Aéronautique anglaise est aussi le nôtre; sa peine est la nôtre.

C'est un devoir pour ce journal de saluer bien bas, a cette place, en tête de ce numéro, les cinquante victimes de la catastrophe de Beauvais et d'exprimer à ses confrères britanniques, avec sa profonde sympathie, ses bien vives et bien sincères condoléances.

## SIR SAMUEL HOARE'S TRIBUTE.

Sir Samuel Hoare, Secretary of State for Air, has written in *The Times* concerning those who died in R.101 words which deserve to be remembered by all concerned with aeronautical affairs. He says:—

Sir,—The disaster that has destroyed R.101 is so overwhelming in the suffering that it has imposed upon many families and the injury that it has inflicted upon aeronautical science that any comment on its immediate cause or its ultimate result is at the moment inappropriate. To-day I am thinking not of the future of airships, still less of the money and effort that have been spent upon a difficult experiment. I am remembering rather the band of brothers, who for eight years were engaged upon a great adventure and who have died together at the very moment when the success of their enterprise seemed assured.

Of the lives of Lord Thomson and Sir Sefton Brancker your columns will recount the details. Their names will rightly hold a very high place in the history of British aeronautics. Lord Thomson and I had been friends for many years before our ways crossed at Whitehall. Being closely connected with him at the Air Ministry I had many opportunities for appreciating his fine mind and vivid enthusiasm.

With Sir Sefton Brancker I was in constant contact for six years. Never did a Government office have the services of a keener or more lively official. Doubt vanished before his confidence, opposition went down before his zeal. His is the name that stands most conspicuously for civil aviation in every country of the world.

These were two notable personalities. The other victims were only now stepping upon the front of the stage, their names still to be established, their careers not yet consummated. Richmond, the subtle designer, who laboured well the minute particulars of every plan; Scott, the fearless navigator, who had twice taken an airship across the Atlantic; Colmore, the quiet and tactful administrator who supervised the work at Cardington; Irwin, the captain of the ship, as brave in death as he had been steadfast in life; Johnston, who in the teeth of rain and sand and wind could keep a course as straight as a furrow; Giblett, the meteorologist, who, with rare skill, helped to chart the air between England and the East—these were the men who, if they had lived, would have stamped their achievements upon British history.

I knew them well. For years we worked together. They were as a religious community intent upon a high ideal. Neither disappointment nor success deflected them from their life's work. When I talked with them at Cardington I knew that I was in the presence of determined men of set purpose. When I flew with them I marked the rare balance between brain and hand and eye that their airmanship displayed.

And now they have died together, and with them has gone a great treasure of gathered knowledge and invaluable experience. For the whole Empire their death is a grievous blow. An experiment that might have been so fruitful in beneficent results is now encompassed by the black clouds of unrelieved tragedy. Another band of pioneers have sacrificed their lives on the long trail of the Empire's advance. A great public sorrow indeed, but a private sorrow even greater, for the men who have been killed were as dearly loved in their homes as they will be honourably respected in the wider world outside.

Your obedient servant.
SAMUEL HOARE.

## THE ROYAL AERO CLUB'S TRIBUTE.

The following resolution was unanimously passed on Oct. 8 by the Committee of The Royal Aero Club:—

The Committee of the Royal Aero Club desires to place on record its great sorrow at the disaster to the airship R.101 and the loss of so many valuable lives.

Lord Thomson, as Chairman of the Club in 1926-8, won the esteem of all members by his energetic and unfailing support to the cause of aviation and, as Secretary of State for Air, by his selfless devotion in advancing Empire air communications.

Sir Sefton Brancker, as a member of the Committee and Chairman of the Racing Committee for many years, rendered invaluable service to the Club. As Director of Civil Aviation he stimulated British aerial effort throughout the World and his enthusiasm, tireless activity and goodwill won admiration and respect from all who came in touch with him.

## AN APPRECIATION.

The following letter from one of the closest friends and colleagues of Sir Sefton Brancker will be valued by the many people who appreciated our late D.C.A.:—

Sir,—The disaster to R.101, in which so many friends of those of us who are connected with Aviation have been taken from our midst with tragic and almost unbelievable suddenness, has inflicted a feeling of the deepest personal loss. It seems impossible to realise that we shall never see them amongst us again.

Perhaps I, being one of the few people who for several years worked daily in the closest relationship with Sir Sefton Brancker may be permitted to pay a sincere tribute to his memory.

We all knew his boundless energy, his unfailing enthusiasm, his big grasp and his constant desire for progress and always more progress. We all knew his marvellous cheeriness even under the most adverse conditions, but perhaps everyone doesn't fully appreciate what a truly great man "Brancks" was. He was always seeking for knowledge, and in that connection I believe that the secret of his greatness was to be found.

Few people probably realise that, in spite of his justified self-confidence and his seemingly entire self-reliance, in questions of importance when he had made up his own mind he almost invariably sought a further opinion, and in the case of that opinion being at variance with his own he never failed to be open to conviction, which is surely characteristic of a very great man.

He was, of course, the greatest ambassador of Aviation which any country could ever hope to possess, and I wonder if this great talent, of which he gave our country the benefit, was fully appreciated.

He was the most delightful master, working like fury himself and expecting others to do likewise. He never spared himself, but, at the same time, he was always full of consideration for others.

As he worked, so he played.

We have lost a great-hearted friend, a great man and the biggest asset which Civil Aviation possessed.

The only consolation which I can see, if it be one, is that

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Mr. F. Gough (Avian) - - - 1st

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he died, as I know he would have wished to die, at the height of his career, still full of vitality and doing his job.

The greatest tragedy which could have happened to him would have been if he had lived to the realisation of old age.

(Signed) Ivo Edwards.

[As Deputy D.C.A., Lt.-Col. Ivo Edwards had the best possible opportunities of knowing Sir Sefton Brancker's ways. This letter arrived just after last week's issue of The Aeroplane had gone to press, and so, regrettably, could not be published till now.—C. G. G.]

## MESSAGES TO THE R.Ae.S.

Telegrams of sympathy in the loss of life in the accident to R.101 have been received by the Royal Aeronautical Society from:—

The *Wissenschaftliche Gesellschaft fur Luftfahrt*, Berlin. The *Associazione Italiana Aerotecnica*, Rome.

Dr. Hugo Eckener, President of the Zeppelin Company,—who came to England specially to be present at the Memorial Service.

Mr. Edward Warner, late Assistant Secretary for Aeronautics of the United States Navy. Now Secretary and General Manager of the Society of Automotive Engineers, and editor of *Aviation*, New York.

Doctor Kiep, Director of the Hamburg-Amerika Line and the Liaison Officer between the Hamburg-Amerika Line and the Zeppelin Airship Company.

Mr. Halla, of the Royal Norwegian Aero Club.

## MESSAGES TO THE ROYAL AERO CLUB.

The Royal Aero Club has received messages of sympathy from the following Aeronautical Bodies abroad:—

The *Fédération Aéronautique International*, Paris. The Magyar Aero Club, Budapest. The Royal Aero Club of Italy, Rome. The Swiss Aero Club, Berne.

The Aero Club of Jugo-Slavia, Belgrade. The Aero Club of France, Paris. The Aero Club of Germany, Berlin. The Aero Club of Egypt, Cairo.

The Aero Club of Cannes, Cannes. The Royal Aero Club of Belgium, Brussels. The Aero Club of Roumania, Bucharest. The Aero Club of Argentine, Buenos Aires.

The Turkish Aviation League, Angora. The National Aeronautic Association, Washington. The Aero Club of Poland, Warsaw. The Aero Club of Spain, Madrid. The Aero Club of Portugal, Lisbon. The Spanish Aeronautical Federation, Madrid.

## SOME NOTES OF SYMPATHY.

The following messages have been received by The Aeroplane:—

From Colonel H. Walaardt Sacré of the *Koninklijke Nederlandsche Vereeniging voor Luchtvaart*, Holland:—

I cannot tell you how sorry we all are over the misfortune of the R.101 and the grievous loss of so many good men.

From Mr. Valdemar Cronstedt, of Williamsport, Pennsylvania:—

Pleace accept my profound sympathy in the terrible tragedy of Beauvais.

From Mr. Cabos, Managing Director of the Aviolanda Works, Holland:—

Please accept my sincerest sympathy on the disaster of the R.101.

From the Editor of *Flug*, Vienna:—

Shaken by the grave disaster of R.101 the editor and the editorial staff of our journal beg you to accept our deepest regret in consideration of the terrible loss of such valuable personalities of the British Aviation.

From Dr. Waldemar Beck, Berlin:—

I wish to say to you to-day that we all in this country regret very deeply together with you the heavy loss you have suffered by this disaster of your beautiful R.101. It is in all ways a tragedy of human imperfection which affects us all. You may be sure that all the German aviators think exactly as I think myself, and I should be glad if you would kindly accept my few words as they are intentioned, as a sign of real, heartily felt comradeness with new regained friends which we hope to never lose again.

## MONSIEUR LAURENT EYNAC.

The Paris correspondent of *The Daily Mail*, in a message dated Oct. 13, states:—

The following was received from the British Embassy this evening:—

When M. Laurent Eynac, the French Air Minister, was received by the Prince of Wales at St. James's Palace, London, on October 10 (Friday), the Prince expressed to him the personal gratitude of the King for the prominent share that M. Laurent Eynac himself had in the measures taken by the French Government and nation in the rescue operations in connection with the loss of the R.101.

As a token of his Majesty's appreciation of the assistance rendered by M. Laurent Eynac on this occasion, his Royal Highness, by command of the King, conferred upon him the insignia of Knight Grand Cross of the Most Excellent Order of the British Empire.

## BIOGRAPHICAL NOTES.

The following notes describe briefly the careers of victims of the R.101 concerning whom no information was available last week:—

### Squadron Leader Palstra.

Squadron Leader W. Palstra, M.C., Royal Australian Air Force, who was killed in the disaster to the R.101 on Oct. 5, was born in 1891. He joined the Australian 39th Infantry Battalion in 1915 and later transferred to the Australian Flying Corps. He was awarded the Military Cross for gallantry in the Field.

After the Armistice he graduated B.A. at the Melbourne University and was appointed to an administrative position there.

He rejoined the Royal Australian Air Force a few years ago. In 1929 he attended a course at the Royal Air Force Staff College, Andover, and early this year he was appointed Australian Liaison Officer at the Air Ministry.

### Major Percy Bishop.

Percy Bishop was born in 1888 and was educated at Kendrick School, Reading, at the Regent Street Polytechnic, and at Sheffield University. He was apprenticed to Clement Talbot Ltd. and later served with the Sheffield Simplex Company and with D. Napier and Sons Ltd. In 1912 he joined the Royal Aircraft Factory as a designer and afterwards as Chief Inspector. In 1915 he was appointed to a temporary commission in the Royal Flying Corps and was promoted to Captain in 1917. In 1918 he was appointed to the R.A.F. Reserve with the rank of Major. He was awarded the M.B.E., both civil and military, in 1919 in recognition of his services during the War 1914-18. At the time of his death he was Chief Inspector, Aircraft, in the Directorate of Aeronautical Inspection.

Major Bishop was an Associate Member of the Institution of Automobile Engineers, an Associate Fellow of the Royal Aeronautical Society (1918) and a Member of the Institution of Civil Servants. He was a very keen sportsman, and played Rugby Football for many years for the Wasps Club. He was Chairman of the Air Ministry Football Club.

A friend writes of him, "His kindly nature and genial disposition endeared him to all with whom he came in contact."

### Alexander Bushfield.

Alexander Bushfield served an apprenticeship in engineering with a Glasgow firm and joined the Royal Navy in 1900. The latter part of his Naval service was with the Admiralty Airship Section, Airship Trials Staff. Throughout the War 1914-18 he was overseer of airship construction, and on the formation of the R.A.F. he was appointed to a commission in that Service with the rank of Flying Officer.

On Jan. 1, 1919, he was named in *The London Gazette* for gallant and distinguished services. In February 1921 he was highly commended by the Air Council for his courageous and resourceful action in personally extinguishing a petrol fire in the inflated airship R.36 at the Inchinnan Airship Station.

In 1923 he was appointed an Assistant Inspector in the Aeronautical Inspection Directorate. In 1925 his work on the reconditioning of H.M. Airship R.33 was recognised by the Air Ministry.

A friend writes of him:—"The fidelity and energy he devoted to his duty endeared him to all."

## AN APPRECIATION.

The Rev. D. H. G. Sargent, vicar of St. Luke's, Radcliffe Square, Kensington, who is a brother-in-law of the late Lord Thomson, Secretary of State for Air, has written to the Press as follows:—

As a relative of one of those splendid men who lost their lives in the R.101 disaster, I wish to pay a grateful tribute to the Air Ministry and the R.A.F. for the extraordinarily efficient manner in which they managed and carried through the arrangements for Saturday's solemn rites. No one but those most closely concerned will ever know of the magnitude of their task, though many must have realised fully how well they performed it. But especially I wish to put on record my deep appreciation of their sympathetic solicitude on behalf of the bereaved. It was touching beyond words, and the officers of the R.A.F. to whose care we were committed could not possibly have done more than they did throughout the whole of a long and trying day nor could they have done it with greater efficiency and gentleness. I am sure I may speak for all when I say we are deeply grateful.

## OFFICIAL RECOGNITION.

The Prime Minister sent the following telegram on Oct. 1 to Dr. Eckener, commander of the *Graf Zeppelin*:—

Before you leave this country I wish to thank you, and through you the German nation, most warmly for the deep sympathy which you have extended to us in our grief at the disaster to R.101. The presence of yourself and Captain von Schiller, of the Zeppelin Company, at the ceremonies in London and at Bedford last Saturday was clear proof of the bond which unites airmen of all countries.—Rams. MacDonald.

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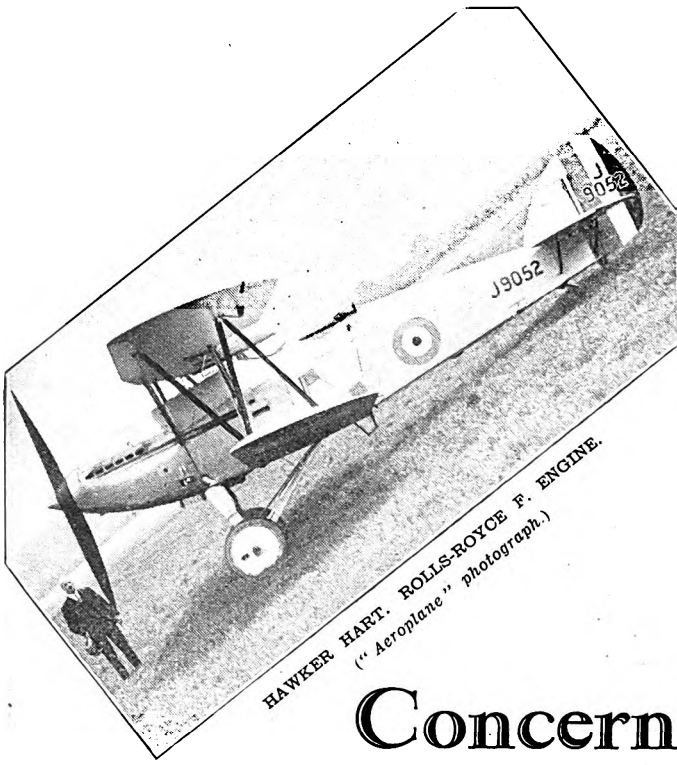
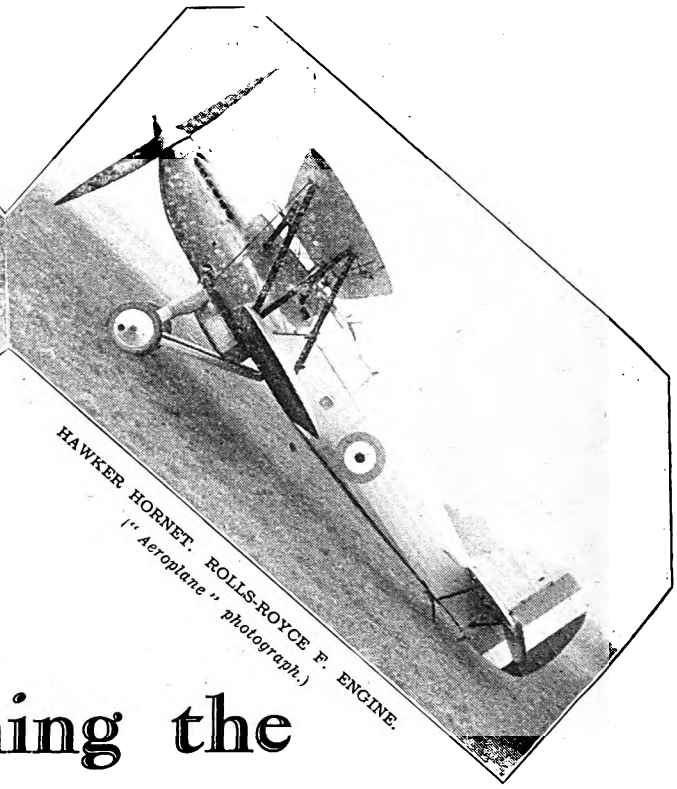



HAWKER HART. ROLLS-ROYCE F. ENGINE.
(" Aeroplane " photograph.)



HAWKER HORNET. ROLLS-ROYCE F. ENGINE.
(" Aeroplane " photograph.)

# Concerning the Air Exercises of the R. A. F., 1930

" I saw a succession of striking raids which showed dramatically the advantage of high speed in bombing. Although the 'HARTS' were less than 2,000 feet up the defending fighters, actually far inferior in speed, had no chance. It was 180 miles per hour versus 150 miles per hour."—*The Daily Telegraph*, Aug. 13th.

" To the ordinary observer there seemed to have never been any hope that the defence could come up to these fast machines." —*The Times*, Aug. 13th.

" A completely successful raid by flights of 'HARTS,' the fastest of all the bombers, which left the defending fighters standing." —*The Times*, Aug. 14th.

" The Day Bomber already referred to is the 'HART.' The only already adopted fighter which could deal with it is the 'HORNET.' " —*The Daily Telegraph*, Aug. 16th.

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, October 7.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following are granted perm. comns. as Plt. Offs. with effect from Sept. 27 and with seniority of the dates stated:—Flg. Off. H. St. G. Burke (R.A.F.O.) (Mar. 27, 1929); Plt. Off. T. B. Cooper (R.A.F.O.) (Sept. 27, 1929); H. Ford (Sept. 27, 1929); Plt. Off. P. E. Hudson (R.A.F.O.) (Mar. 27, 1929); G. E. W. Parish (Sept. 27, 1929); Plt. Off. W. R. Sadler (R.A.F.O.) (Sept. 27, 1929).

Lt. F. C. Tracey (Yorks and Lancs Regt.) is granted a temp. comn. as a Flg. Off. on being seconded for duty with the R.A.F. (Sept. 27).

Sq. Ldr. J. Noakes, A.F.C., M.M., is restored to full pay from half-pay (Oct. 6).

Lt. S. T. Morgan, R.N., is reattached to the R.A.F. as a Flg. Off. with effect from Dec. 10, 1929, and with seniority of June 16, 1924. (Substituted for notification in the *Gazette* of Jan. 7, 1930.)

The following Plt. Offs. are promoted to the rank of Flg. Off. (Aug. 22):—C. S. Gill, V. R. Moon, F. R. W. Goad, E. D. Bishop, E. A. Cooke, T. H. Wilson, G. H. A. Blackwood, T. W. Hoyle. Sept. 15:—J. D. Baker-Carr.

Wing Cdr. J. C. Russell, D.S.O., is granted the acting rank of Group Capt. while commanding Station H.Q., Amman (April 10).

Sq. Ldr. A. FitzRoy Somerset-Leeke, O.B.E., is seconded for duty as Technical Adviser to the Greek Air Ministry and is granted the acting rank of Wing Cdr. while so employed (Sept. 23).

Plt. Off. D. W. Smythe takes rank and precedence as if his appointment as Plt. Off. bore date May 22, 1929. Reduction takes effect from Sept. 18.

Flg. Off. L. S. Tindall is transferred to the Reserve, Class A (Sept. 24).

Flg. Off. A. W. H. Nelson relinquishes his S.S. comn. on account of ill-health (Oct. 1). The S.S. comn. of Plt. Off. on probation L. Sloman is terminated on cessation of duty (Sept. 17).

STORES BRANCH.—Flt. Lt. H. V. Robbins is placed on the retired list (Oct. 6).

ACCOUNTANT BRANCH.—Flt. Lt. E. C. Green is placed on the retired list on account of ill-health (Oct. 8).

MEDICAL BRANCH.—The undermentioned officers are granted perm. comns. in the rank stated (Oct. 8):—FLT. LTS.—R. E. Alderson, M.B., B.S.; G. W. Paton, M.B., Ch.B.; P. B. L. Potter, M.B., Ch.B.; S. B. S. Smith, L.M.S.S.A. FLG. OFF.—N. M. Jerram, M.R.C.S., L.R.C.P.

DENTAL BRANCH.—Flt. Lt. (Hon. Sq. Ldr.) E. A. Wheeler, L.D.S. (Temp. Major, General List, Army Dental Surgeon), is transferred from the Army to the R.A.F. (July 1). (Substituted for notification in the *Gazette* of Sept. 30.)

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—H. P. L. Higman is granted a comn. in Class C as a Flg. Off. (Oct. 7). Flg. Off. H. W. Knott is transferred from Class A to Class C (Aug. 16).

Flt. Lt. B. C. Adamson relinquishes his comn. on completion of service, and is permitted to retain his rank (Sept. 12).

The following relinquish their comns. on appointment to perm. comns. in the R.A.F. (Sept. 27):—Flg. Off. H. St. G. Burke, Plt. Off. T. B. Cooper, Plt. Off. W. R. Sadler, Plt. Off. P. E. Hudson. Flg. Off. W. C. Kilvington (Major, R.A.R.O.) resigns his comn. (Oct. 8).

STORES BRANCH.—Flg. Off. H. C. Haywood-Gibbons relinquishes his comn. on completion of service and is permitted to retain his rank (Sept. 12).

MEDICAL BRANCH.—Flt. Lt. J. A. Quin, M.D., B.A., relinquishes his comn. on account of ill-health (Oct. 8).

## Appointments.

*Week ending October 13.*

GENERAL DUTIES BRANCH.—Wing Commander E. J. P. Burling, D.S.C., D.F.C., A.F.C., to H.Q., Coastal Area, for Air Staff duties, 1/10.

Squadron Leaders E. D. Johnson, A.F.C., to M.A.E.E., Felixstowe, 24/9. G. E. Godsave, to R.A.F. Base, Calshot, 1/10.

Flight Lieutenants H. W. St. John, D.F.C., to R.A.F. Depot, Uxbridge, 28/8. R. O. Jones, to R.A.F. Depot, Uxbridge, 1/10. A. F. Hutton, to R. A. F. Depot, Uxbridge, 1/10. G. J. Southam, to H.Q., Wessex Bombing Area, Andover, 1/10. R. W. M. Hall, to No. 25 Sqdn., Hawkinge, 1/10.

Flying Officers J. B. M. Wallis, to C.F.S., Wittering, 29/9. P. G. Thomson, to R.A.F. Base, Gosport, 2/10. H. P. F. Fagan, to C.F.S., Wittering, on appointment to a S.S. Comn., 27/9.

Pilot Officers G. B. Keily, to No. 1 Sqdn., Tangmere, 23/9. W. F. Hilchie, to R.A.F. Depot, Uxbridge, on appointment to a S.S. Comn., 22/9. The following are all posted to No. 5 F.T.S., Sealand, on appointment to Perm. Comns., with effect from 27/9:—H. St. G. Burke, T. B. Cooper, H. Ford, P. E. Hudson, G. E. W. Parish, W. R. Sadler.

MEDICAL BRANCH.—Squadron Leaders A. Briscoe, to C.F.S., Wittering, 7/10. F. E. Johnson, to Station H.Q., Kenley, 10/10.

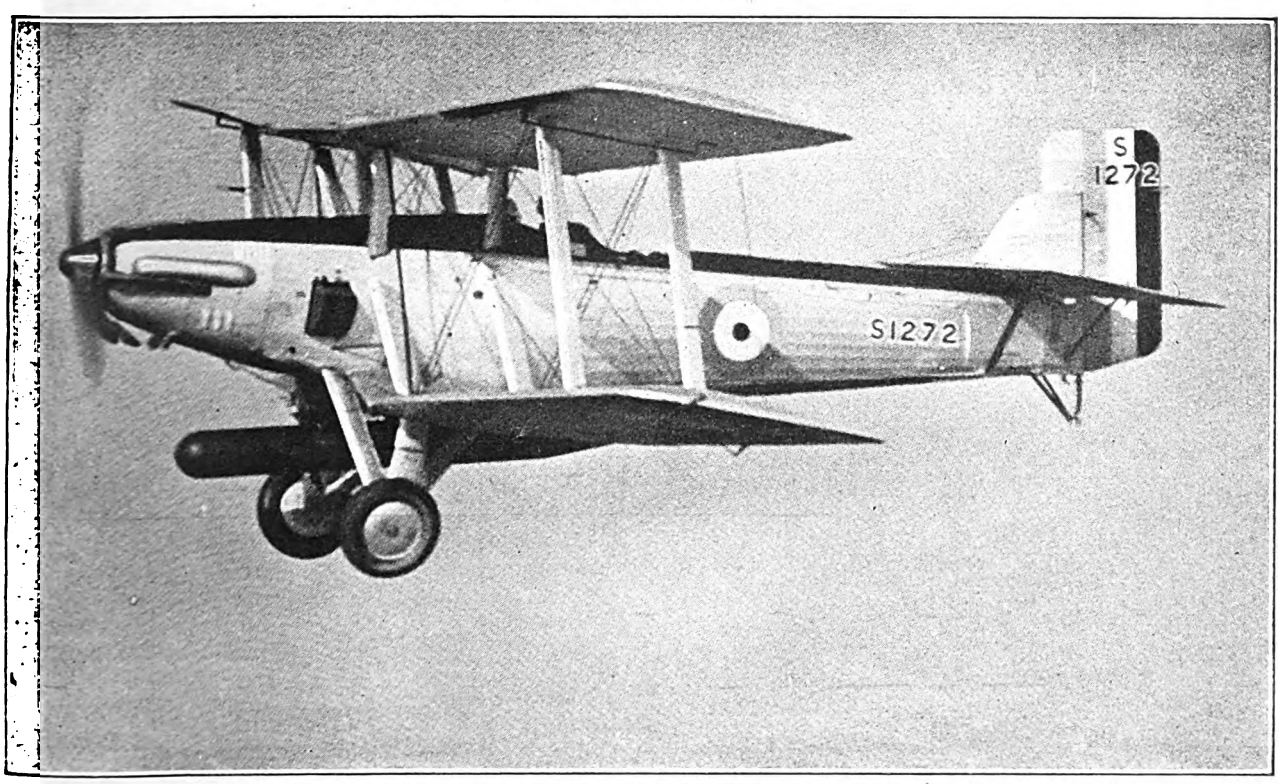
Flight Lieutenant M. J. Cahalane, to No. 2 F.T.S., Digby, on appointment to a Temp Comn., 3/10.

ACCOUNTANT BRANCH.—Flying Officer S. C. George, to No. 504 Sqdn., Nottingham, 3/10.

## Fatal Accidents.

The Air Ministry regrets to announce that as the result of an accident at Aboukir Bay on Oct. 7, 341524 Cpl. Leslie Arthur Knight was killed. Flt. Lt. Harold Hunter Down, A.F.C., the pilot of the aircraft, a Fairey 3F, machine, of No. 448 (Fleet Spotter Reconnaissance) Flight, attached to H.M.S. *Eagle*, Mediterranean Station, was not injured.

The Air Ministry regrets to announce that as the result of an accident at Martlesham Heath to a Vickers machine of No. 22 (Bomber) Squadron, Martlesham Heath, Suffolk, on Oct. 9, No. 508206 AC 1 William Henry Dack Minns was killed. The pilot and other occupants of the machine were not injured.




THE LATEST TORPEDO CARRIER.—The new Blackburn Ripon (Napier Lion engine), which is now of all-metal construction, flying in the vicinity of the Humber.—(*"Aeroplane" photograph.*)

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### The West African Flight.

The R.A.F. West African Flight for 1930 starts on Oct. 14 and will go further west than any previous flight, as the ultimate destination is Bathurst, in Gambia.

The Flight will consist of machines and personnel of No. 47 (Bomber) Squadron, Khartum, under the command of Sq. Ldr. E. L. Howard-Williams, M.C. The machines are Fairey III F's (Napier Lion engine).

The principal stopping places are to be El Fasher (Sudan), Fort Lamy (Chad), Kano and Sokoto (Nigeria), Ouagadougou (Upper Volta), Bamako (French Sudan), Freetown (Sierra Leone), and Bathurst (Gambia).

If there are no delays the Flight should arrive at Bathurst on Nov. 3 and will begin its return voyage on Nov. 8. On the return trip the Flight will go first to Kayes, in the French Sudan, and from there to Bamako, and then follow the route of the outward journey.

At Kano, Sokoto, Freetown and Bathurst the Flight will co-operate with Army formations.

No. 47 (Bomber) Squadron is top of the Middle-East Command for flying hours this year, with a total of between 600 and 700 hours a month. Some of their machines are fitted with floats.

### Air Commodore Sir Francis Humphrys.

The *London Gazette* of Sept. 30 announced the appointment of Lieutenant-Colonel Sir Francis Humphrys, G.C.V.O., K.C.M.G., K.B.E., C.I.E., to a commission in the Reserve of Air Force Officers, Class C. General Duties Branch, with the rank of Air Commodore.

Sir Francis Humphrys, who served in the War 1914-18 as a pilot in the Royal Air Force, was British Minister at the Court of the King of Afghanistan when, at the end of 1928 and the beginning of 1929, 586 men, women, and children were evacuated from Kabul by aeroplanes of the Royal Air Force without loss of life. Sir Francis Humphrys was in the last aeroplane to leave the city.

Sir Francis Humphrys was appointed High Commissioner for 'Iraq in December of last year and flew in a Service aeroplane from Palestine to Baghdad, to take up his appointment.

### Service Aircraft Markings.

The standard R.A.F. markings on the rudders of Service aircraft has been altered to avoid confusion with that of the French Air Force. The order of the colours has been reversed and red is now next to the rudder-post with white in the middle and blue on the outside.

The red, white, and blue circles which are the R.A.F. markings on the wings and fuselage of their machines remain unaltered.

### Desert Salvage.

The Baghdad correspondent of *The Times* in a message dated Oct. 13, states:—

The co-operation of the R.A.F. was invaluable in finding two aeroplanes belonging to the Imperial Airways which had to make forced landings in the desert. The west-bound machine, with the Indian mails, which left here last Friday, had to make a forced landing, and another machine sent from Baghdad by the Imperial Airways on Saturday to look for the former suffered a like fate.

Until noon to-day no news was available as to the whereabouts of either machine, but pilots of aeroplanes from No. 70 Squadron, R.A.F., which had been scouring the desert during the week-end, announced this afternoon that both machines had been found and the mails sent on to Cairo.

Latest infomation is that the first machine, a Westbound Hercules, had some engine trouble about 100 miles west of Rutbah Wells and landed at the emergency landing ground M. The other Hercules sent to find them seems to have failed in that errand, whether from forced landing or not is at present unknown, but it returned to Rutbah Wells.

A new engine was sent out to the marooned machine, which will then fly back. The passengers were picked up by an R.A.F. machine, and were probably taken to Gaza, as a Westbound machine has been signalled from there with a full load. No damage to personnel or equipment has been reported.

### Leading the Field.

No. 12 (Bomber) Squadron, R.A.F., whose photograph, in sections, adorns page 876A of The Aeroplane this week, has more than justified its motto of *Leads the Field* this year. The Squadron's aim has been to clean up everything for which they competed and the following list of achievements shows how they have succeeded.

*Air Pilotage Exercise*—First in order of merit.

*Camera Obscura Exercise*—Best bombing average.

*Wessex Area Annual Essay Competition*—Won by a member of the Squadron for the third year in succession.

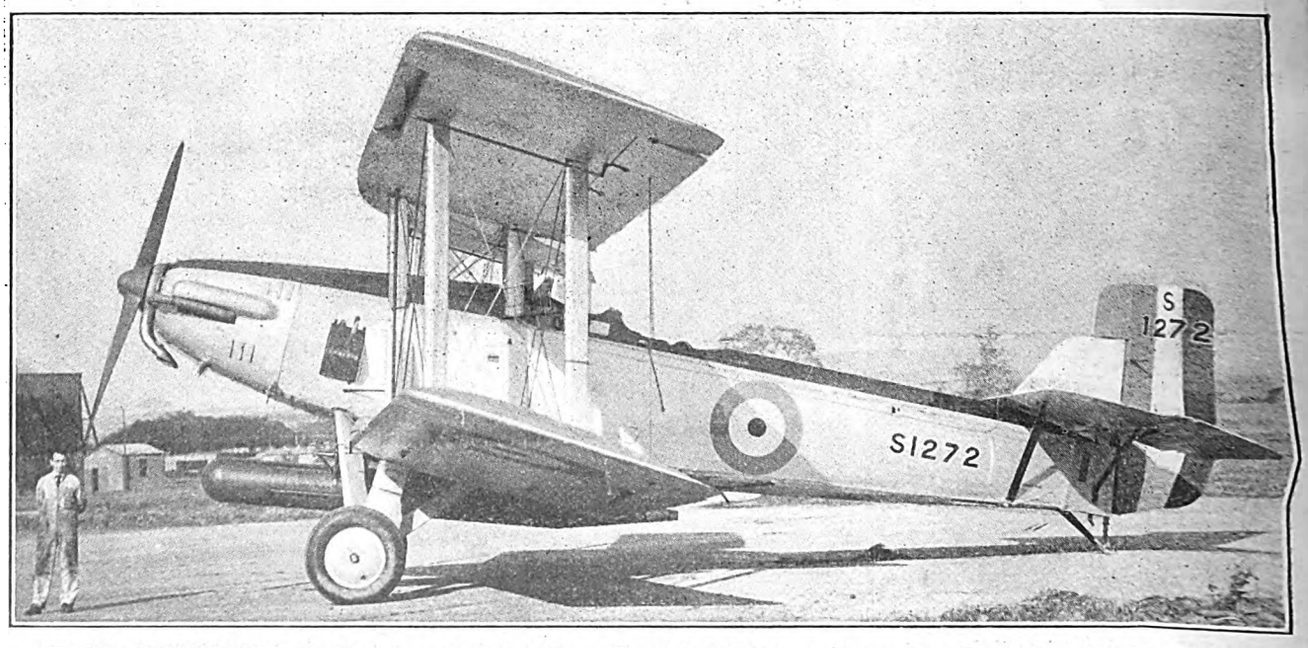
*Brooke-Popham-Steel Shooting Cup for the best Squadron Rifle Team*—Won by No. 12 Squadron at Bisley, June, 1930.

*Armament Officers' Bombing Trophy*—First holders and the Squadron top of the Day Bombers for the third year in succession.

The history of No. 12 Squadron has not yet been written. But meantime we may say that as a Unit of the Royal Flying Corps it was formed in February, 1915, and arrived in France on Sept. 6 of that year. No. 12 Squadron took a valiant part in the Battle of Loos and the engagements which followed, under the command of Major C. L. N. Newall,—now Air Vice-Marshal.

On the reorganisation of the R.F.C. in January, 1916, No. 12 Squadron was retained at R.F.C. Headquarters for special strategical and patrol work. Detailed for the duty was No. 21 Squadron and in May, 1916, these were made the Ninth Wing. No. 12 Squadron, eq with B.E.2c's, did an enormous amount of long bombing and succeeded in destroying a number of aerodromes, rail-heads, ammunition dumps, and rolling stock.

In July, 1916, the Squadron took part in the Battle of the Somme under the command of Major J. C. Halahan. In 1917 it was part of the 12th Wing and at the time of the Armistice it was at Duren and commanded by Major T. Q. Back.




**FLEET ARMAMENT.—A side view of the latest all-metal Blackburn Ripon torpedo-carrier (Napier Lion engine).** —(*"Aeroplane" photograph.*)

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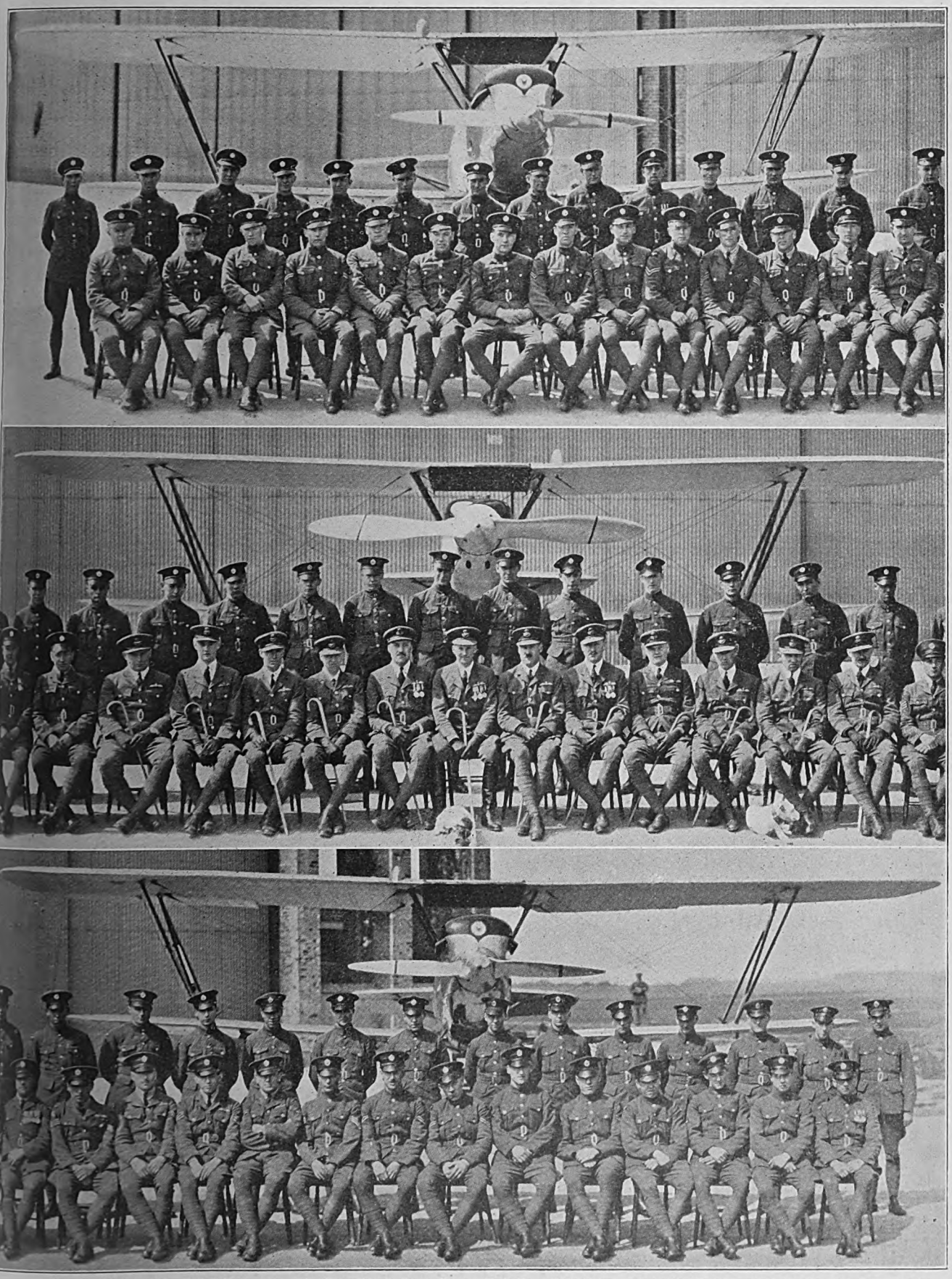
No. 12 Squadron became part of the British Army of the Rhine after the Armistice where it was commanded first by Sq. Ldr. R. E. Saul and later by Sq. Ldr. H. J. F. Hunter.

The Squadron was disbanded in July 1922 and re-formed in April, 1923, at Northolt. It moved to Andover at the end of that year and was equipped with Fairey Fawns. In 1926 it became part of the newly-formed Wessex Bombing Area and in 1927 it was re-equipped with Fairey Foxes, some of them with Curtis D.12 engines and some with Rolls-Royce F.XI engines.

From 1926 to 1929 the Squadron was commanded by Sq. Ldr. T. E. Salt, A.F.C., and in September, 1929, it was taken over by Sq. Ldr. F. H. M. Maynard, A.F.C., who is still in command.

Sq. Ldr. Maynard was the pilot of the machine which won the Armament Officers' Bombing Trophy for the Squadron and Corporal Hancock was the bomb-aimer.



"LEADS THE FIELD."—No. 12 (Bomber) Squadron, R.A.F., with three of their Foxes at Andover in May 1930.

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### The Royal United Service Institution.

The programme of lectures at the Royal United Service Institution for the season 1930-31 is as follows:—

*Oct.* 29.—"The Change in the Naval Situation," by Admiral Sir Richard Webb, K.C.M.G., C.B. The Viscount Chelmsford, G.C.S.I., G.C.M.G., G.C.I.E., G.B.E., in the Chair.

*Nov.* 12.—"The Work of the Air Force in Aden," by Sq. Ldr. the Hon. R. A. Cochrane, A.F.C., R.A.F. Field Marshal Sir Claud W. Jacob, G.C.B., G.C.S.I., K.C.M.G., Chairman of the Council, in the Chair.

*Nov.* 19.—"The Army as a Career," by Lieut.-Col. G. McM. Robertson, D.S.O. Major-General C. Bonham-Carter, C.B., C.M.G., D.S.O., in the Chair.

*Nov.* 26.—"Power Fuel for the Services," by Professor J. S. S. Brame, C.B.E., F.I.C., F.C.S. Engineer Vice-Admiral R. W. Skelton, C.B., C.B.E., D.S.O., in the Chair.

*Dec.* 3.—"The Work of our China Gunboats," by Vice-Admiral H. J. Tweedie, C.B. Admiral Sir Reginald Tyrwhitt, Bart., G.C.B., D.S.O., D.C.L., in the Chair.

*Dec.* 10.—"The Development and Future of Armoured Fighting Vehicles," by Colonel F. A. Pile, D.S.O., M.C. Lieut.-General Sir Webb Gillman, K.C.B., K.C.M.G., D.S.O., in the Chair.

*Jan.* 14, 1931.—"Armoured Cars in Desert Warfare," by Sq. Ldr. G. E. Godsave, R.A.F. Air Vice-Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., in the Chair.

*Jan.* 21.—"The Higher Study of War in the Services," by Vice-Admiral W. H. D. Boyle, C.B. Field Marshal Sir George F. Milne, G.C.B., G.C.M.G., D.S.O., in the Chair.

*Jan.* 28.—"Economic Pressure on Continental Victories," by Capt. B. H. Liddell Hart. Colonel the Lord Ampthill, G.C.S.I., G.C.I.E., in the Chair.

*Feb.* 4.—"High Speed Craft for Naval Uses," by Sir John Thornycroft, K.B.E. Vice-Admiral R. R. C. Backhouse, C.B., C.M.G., in the Chair.

*Feb.* 11.—"The Future of Aeroplane Design for the Services," by C. R. Fairey, Esq.

*Feb.* 18.—"The Merchant Navy in War," by Commander C. Norman-Jones, D.S.O., R.D., R.N.R. Admiral of the Fleet Sir Roger J. B. Keyes, Bart., G.C.B., K.C.V.O., C.M.G., D.S.O., in the Chair.

*Feb.* 25.—"The Land and Air Defences of Australia," by Major-General J. H. Bruche, C.B., C.M.G., Australian Representative, Imperial General Staff. The Rt. Hon. L. S. Amery, Esq., P.C., M.P., in the Chair.

*Mar.* 3.—The Anniversary Meeting (15.30 hours).

*Mar.* 4.—"Meteorology and Air Navigation," by Lieut.-Cdr. J. W. Josselyn, R.N. Rear-Admiral H. P. Douglas, C.B., C.M.G., in the Chair.

All lectures begin at 15.00 hours and each member may introduce two friends.

### Aircraft Nomenclature.

The new Air Ministry method of naming new types of Aircraft, which was described in The Aeroplane some months ago, takes effect with the Hawker Hornet which will be known as the Hawker Fury (F=Fighter) when it comes into service in the near future.

The first Squadron to be equipped with the Hawker Fury (Rolls-Royce F.XI S engine) will be No. 32 (Fighter) Squadron which is stationed at Kenley.

### Foreign Officers with the R.A.F.

Captain Hamalainen, Chief of the Finnish Mechanics' School and Captain Haatanen of the Finnish Flying School are attached to the School of Technical Training (Apprentices) R.A.F., Halton from Oct. 6 to Oct. 31 for a course of instruction.

For a few days, early in November, these officers will be attached to the Home Aircraft Depot, R.A.F., Henlow to watch the work and administration of that Unit.

### The R.A.F. Football Association.

The Officers of the R.A.F. Football Association for the Season 1930-31 are as follows:—

*President*:—Air Vice-Marshal H. C. T. Dowding, C.B., C.M.G. *Vice-Presidents*:—Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C., Air Commodore T. C. R. Higgins, C.B., C.M.G., Group Captain H. R. Busteed, O.B.E., A.F.C., Group Captain A. S. Barratt, C.M.G., M.C. *Chairman*:—Wing Cdr. C. C. Miles, M.C. *Council*:—One representative from each R.A.F. Station. *Honorary Secretary*:—Flg. Off. D. W. Sugden. *Honorary Treasurer*:—Flg. Off. K. A. Jackman. *Honorary Secretary, Referees' Committee*:—Flt. Lt. W. R. Castings, M.B.E. *General Committee*:—The Chairman, the Hon. Secretary, the Hon. Secretary, Referees' Committee, the Hon. Treasurer, Sq. Ldr. W. J. King, D.C.M., Flt. Lt. F. T. MacElwee, Flt. Lt. V. Croome, Flg. Off. R. A. Whyte, Flg. Off. R. J. Wishlade, F-S. H. Faux. *Selection Committee*:—Three members selected by the General Committee and F-S. Faux. *R.A.F. Representative on the Council of the Football Association*:—Wing Cdr. C. C. Miles, M.C.

The R.A.F. Representative Fixtures are as follows:—

*Oct.* 25, against Oxford University at Woking. *Oct.* 30, against Hampshire at Cowes.

*Nov.* 8, against Cambridge University at Ilford. *Nov.* 19, against London University at Uxbridge. *Nov.* 26, against the Spartan League at Hitchin.

*Dec.* 11, against Fulham at Fulham. *Dec.* 25 *and* 26, Channel Islands Tour.

1931. *Jan.* 17, against the Corinthians at Wycombe. *Jan.* 28, against the Football Association XI at Uxbridge.

*Feb.* 11, against the Civil Service at Uxbridge.

*Mar.* 14, against the Army in London. *Mar.* 28, against the R.N. and R.M. at Millwall.

Dates have not yet been fixed for the matches against Middlesex, Southampton, and Reading.

All correspondence in connection with the R.A.F. Challenge Cup competitions and the R.A.F., F.A., should be addressed to the Hon. Secretary (Flg. Off. D. W. Sugden, R.A.F. Station, North Weald, Essex). Telephone Epping 196. Telegrams Aeronautics, Epping.

### THE NEW ZEALAND TERRITORIAL AIR FORCE.

The new organisation of the New Zealand Territorial Air Force which allows for a considerable increase in its establishment, came into force on Sept. 1.

Wing Cdr. K. L. Caldwell, M.C., D.F.C., who has been appointed to command the Force, served in the R.F.C. and R.A.F. during the War 1914-18 and at one time commanded No. 74 Squadron.

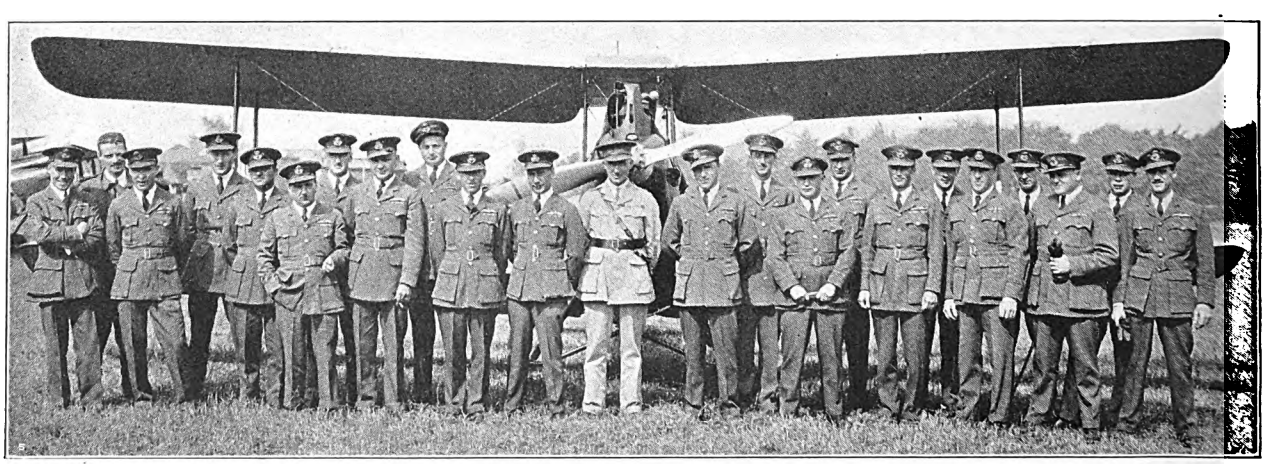
The distribution of commands and units of the New Zealand Territorial Air Force is as follows:—

No. 1 Squadron—Auckland and Hawke's Bay Provinces. (Sq. Ldr. J. Seabrook, A.F.C.).—"A" flight, Auckland, Flt. Lt. J. D. Hewitt. "B" flight, Hamilton, Flt. Lt. F. S. Gordon, D.F.C. "C" flight, Napier, Flt. Lt. T. W. White.

No. 2 Squadron—Wellington and Taranaki Provinces. (Sq. Ldr. M. C. McGregor, D.F.C.).—"A" flight, New Plymouth, Flg. Off. I. H. N. Keith (acting). "B" flight, Wanganui, Flt. Lt. S. A. Gibbons. "C" flight, Wellington, Flt. Lt. G. L. Stedman.

No. 3 Squadron—Nelson, Marlborough, Canterbury and Westland. (Sq. Ldr. Chandler).—"A" flight, Blenheim, Flt. Lt. D. C. Inglis, D.C.M. "B" flight, Christchurch, Flt. Lt. W. L. Harrison. "C" flight, Timaru, Flt. Lt. K. W. J. Hall.

No. 4 Squadron—Otago and Southland. (Sq. Ldr. P. K. Fowler).—"A" flight, Oamaru, "B" flight, Dunedin. "C" flight, Invercargill.



**DOMINION SERVICE TRAINING.—The pilots of No. 1 and No. 2 Training Squadrons, Royal Canadian Air Force, on the occasion of their Aerial Display at the Canadian National Exhibition in September 1930. Left to right: Flt. Lt. J. O'B. Saint, Flt. Lt. F. V. Beamish, R.A.F., Flt. Lt. C. Arthur, Flt. Lt. W. W. Brown, Flg. Off. B. Le Boeuf, Flg. Off. D. T. C. R. Woolcock, Flg. Off. J. R. K. Main, Flg. Off. J. W. Trusler, Flg. Off. A. M. Glover, E. T. Morris, Flt. Lt. T. A. Lawrence, Major G. W. Treleaven, D.S.O., M.C., R.C.A.M.C., Flt. Lt. L. R. Charron, Flt. Lt. F. G. Wait, Flg. Off. T. S. Douglas, Flg. Off. B. A. Davy, Flg. Off. W. S. Lawson, M.M., Flg. Off. H. L. Woolison, Flg. Off. W. V. Thompson, Flt. Lt. A. Lewis, Flg. Off. G. Jenkins, Flg. Off. S. W. Coleman, Flg. Off. R. C. Minnes.**

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# A VARIETY OF RECORDS.

## THE LONDON—CAPETOWN RECORD.

On Oct. 13 the air record from London to Cape Town was handsomely beaten when Mr. R. F. Caspareuthus arrived in the Puss-Moth in which he left Lympne on Oct. 5. The previous record was 9½ days set up by Her Grace the Duchess of Bedford, Mr. C. D. Barnard and Mr. R. F. Little in the Jupiter-engined Fokker.

Mr. Caspareuthus deserves full marks for his performance, for a variety of reasons. Apart from the flight itself being an unusually fine effort it was done entirely as a private enterprise by Mr. Caspareuthus helped by his friend Mr. Marshall of Port Elizabeth, for whom the machine was bought.

The 3,500 miles from London to Khartum took five days, so he did very well in covering the remaining 4,000 miles in three days.

The Director of Civil Aviation in the Union of South Africa, Mr. Francis, has sent to Mr. Caspareuthus the following message:

This is a most valuable undertaking and establishes a record not easily beaten. The Minister is specially pleased, and sends congratulations.

The Minister to which the message refers is Mr. Sampson, Minister of Posts and Telegraphs.

A day or two before Mr. Caspareuthus started he called at the office of The Aeroplane to tell us his plans, and asked us to keep quiet about them because if he failed he did not want anything said, and if he succeeded all he wanted was to have the flight treated on its merits. He did not want any preliminary puffing or advertisement either for financial reasons or for self-glorification. Therefore our congratulations on his success are all the more hearty.

We could do with a great many more men, and women, like Mr. Caspareuthus, in aviation. There is a great deal too much talking about what people are going to do so that whether they succeed or fail they still get the advertisement.—Consider for example all the talk there has been about these Australian flights and mystery flights which have fizzled so badly and given the unbelieving to smile, when if all concerned had joined in a properly organised race public attention would have been diverted from the failures, who would have ranked merely as "also rans."

We in this office have a still further interest in Mr. Caspareuthus because only after his arrival in Cape Town did we discover that he had actually been taught to fly in 1917 by Mr. C. L. Startup, of our Advertising Staff.

Mr. Caspareuthus served for nine years in the R.F.C. and the R.A.F., including the last year and a half of the War. After going home to South Africa he flew as a pilot for a year on the mail service between Cape Town, East London and Durban, which has been run by Union Airways under the direction of Major Allister Miller.

Mr. Caspareuthus' actual flying time was from England to the Cape 78 hours, which means practically an average of 100 m.p.h. all the way. This is extremely good considering that on the early stages of his flight on the morning of Sunday, Oct. 5, he passed through the same violent storm which a few hours earlier had wrecked R.101, and in fact passed within a few miles of the spot without knowing anything about it.

While in Europe Mr. Caspareuthus took a keen interest in gliding and spent a short holiday in Germany on the Wasserkuppe. When he came back he told us that undoubtedly soaring is much more difficult than flying a power-driven aeroplane, and in spite of his years of experience as a pilot he only just managed to qualify for what the gliding people call their "C" licence.

Altogether Mr. Caspareuthus is one of those thoroughly serious students of aviation who is a real hard worker and at the same time is a thorough good sportsman. He told us that his name was originally of Greek origin. Be that as it may, South Africa has every reason to be proud of him.—C. G. G.

## THE AUSTRALIAN PROCESSION.

The air race to Australia, which subsided into an unsubsidised procession, is reversing all the laws of racing. Instead of starting off the mark and tailing out, the field seems to have started tailed out and is bunching towards the goal like an unusually good handicap.

Dealing with the starters in the order of their starting we find that Mr. Matthews, who started on Sept. 16 and reached Rangoon on Sept. 25, and crashed on Sept. 26 and continued on Oct. 9, reached Singapore on Oct. 13. He had a forced landing between Bangkok and Singgora.

Flt. Lt. C. W. Hill left Lympne on Oct. 5 in a Gipsy-Moth and has crossed continents with quite giant-like strides. His progress has been somewhat obscure in its details and he was once reported to have reached Karachi in five days. This was slightly optimistic, but before the accurate information came through Flt. Lt. Hill was long past Karachi, where he arrived on Oct. 11. His time thus far equalled Miss Johnson's, which was the best for a light aeroplane to that date. He went on to Allahabad, where he was delayed by a leaking tank until 22.00 hours on Sunday night. He took off then and flew all night to reach Akyab at daybreak. On his ninth day he got to Rangoon and left shortly after midnight for Singgora. When he left Rangoon he was some days in advance of Miss Johnson's time as she damaged her machine just outside Rangoon, and actually reached Rangoon by rail. Flt. Lt. Hill has two or three days in hand over any previous light aeroplane records for all distances between Rangoon and his position at the moment of writing, and if he keeps up the unsleeping continuity of his progress he may even overtake Mr. Matthews.

Major C. E. M. Pickthorne and Mr. C. J. Chabot left England (Croydon) on Oct. 6, a day after Flt. Lt. Hill. They nearly caught him at Constantinople, but Flt. Lt. Hill has been caught in Turkey once before and is having no more of it.

They were held in that city by rain for a day and then had a forced landing at Lingah on Oct. 10, where the Persian authorities held them up over matters concerned with passports. They got to Karachi on Oct. 13, a few minutes before Wing Commander Kingsford Smith, and are said to be abandoning their attempt on the record.

The last of the procession to leave was Wing Commander Kingsford Smith, who took off from Heston in an Avian (Gipsy II) on Oct. 9. His departure had been delayed by illness, but his journeyings to date carry no great sign of feebleness. His Avian took off with an all-up weight of about a ton, including 113 gallons of petrol, which will give the machines a cruising range of nearly 2,000 miles.

He flew 1,000 miles to Rome on the first day, 650 miles to Athens on the second, 750 miles to Aleppo on the third, 1,000 miles to Bushire on the fourth, and 1,050 miles to Karachi on the fifth.

His non-stop flight from Aleppo to Bushire is one record, and his five days to Karachi on a light aeroplane is another. The unusual range of his Gipsy-engined Avian is an important safety factor on certain stages of his flight, but ordinarily it will not pay him to carry the maximum fuel on stages which daylight will limit to 12 hours or so.

## THESE TRANSATLANTIC RECORDS.

On or about Oct. 10 Mr. Erroll Boyd, a Canadian, and Lieut. Connor, an ex-officer of the U.S. Navy, flew the Atlantic. We cannot imagine why,—except that it may have been for the same reason that a chicken crosses the road.

They started from Harbour Grace, Newfoundland, and landed in the Scilly Isles, appropriately,—on the island of Tresco. Their machine was the *Columbia*, in which Mr. Clarence Chamberlin and Mr. Levine flew from America to Germany some few years ago.

This flight sets up a surprising number of records of the sort beloved by journalists:—

(A) It seems to be the first flight across the Atlantic by a Canadian.

(B) It is apparently the first flight across the Atlantic by an ex-officer of the U.S. Navy in 1930.

(C) It is surely the first crossing by a Canado-American or Americo-Canadian combination.

(D) It is certainly the first crossing by a machine which has crossed the Atlantic before.

(E) It is undoubtedly the first time the *Columbia* has crossed the Atlantic without Mr. Levine.

(F) It is happily the first time that Mr. Levine, who is reputed to have been at Croydon when the machine arrived, has met the *Columbia* after crossing the Atlantic.

(G) It is historically the first flight from Newfoundland to the second largest island in the Scilly group.

(H) It is hysterically the first trans-Atlantic flight by a father of four daughters. (Perhaps that is why he fled.)

There may be other records involved, but we cannot think of them at the moment.

The only question that seems to need an answer is why a flying-boat from the R.A.F. Station at Mount Batten was allowed to fly to Tresco to convey petrol to the *Columbia*? We are not aware that warships of the Royal Navy habitually act as colliers or oil-tankers to tramp steamers which have run short of fuel. There seem to be several better uses to which the British taxpayers' money can be put.

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AN ANGLO-BELGIAN SUCCESS.—M. Hanet and the Belgian Coupe Challenge International.

## THE BELGIAN COUPE CHALLENGE.

An Aviation Meeting was held under the auspices of the *Aéro Club Royal de Belgique* at Saint-Hubert on Sept. 28. At this meeting there was organised a Belgian *Coupe Challenge International* which, among other things, called for a 500-mile circuit round Belgium with three compulsory stops, but further details of the competition are lacking.

This *Coupe Challenge International* was won by M. Hanet, a recent Belgian Puss-Moth owner.

His Puss-Moth was loaded to 1,900 lbs., which included three people and 35 gallons of petrol, and he covered the circuit of rather more than 500 miles in 5 hours total time, which included the time he spent on the ground at the three controls.

## NIGHT FLYING.

An Air Ministry Notice to Airmen states that R.A.F. aircraft will be flying at night between 18,00 hours and 22.00 hours during the period Oct. 13 to Dec. 31 over an area bounded by straight lines joining Chelsfield, Addington, Oxted, Sevenoaks and Chelsfield.

Above an altitude of 5,000 ft. the aircraft will not exhibit navigation lights unless other aircraft are observed in their immediate vicinity.

## LA COUPE ZENITH DES AVIONS LEGERS.

The 1930 *Coupe Zenith des Avions Légers* has been won by M. Edward Bret, who covered a circuit of France, a distance of 1,669 kms. (1,036 miles), at an average speed of 179 km.p.h. (111.159 m.p.h.) in the D.H. Gipsy-Moth which was used by Mr. Alan Butler in the 1930 Circuit of Europe. M. le Comte de Villefranche flying a standard British-built D.H. Gipsy-Moth was second in the contest.

The *Coupe Zenith des Avions Légers* is open to light aircraft whose weight empty is less than 400 kgs. (800 lbs.) subject to allowance of 15 per cent. The aircraft had to fly the circuit Orly-Lyon-Marseille-Toulouse-Bordeaux-Tours in the fastest total elapsed time, the aircraft to make compulsory landings at all the above-mentioned places.

M. Bret made three attempts, the first two of which were interrupted by very bad weather. The third and successful attempt was made on Sept. 27 from Bordeaux. Landings were made at Tours, Orly, Lyon, Marseille and Toulouse and he returned to Bordeaux in a total flying time of 8 hrs. 36 mins. and a total elapsed time of 9 hrs. 22 mins. At Orly and at Lyon the refuelling arrangements were bad and instead of taking three minutes as expected the times at these two places were ten and thirteen minutes respectively. M. Bret carried M. Ginieis as passenger.

M. Edward Bret is the son of Commandant Bret who, after a distinguished military career, now takes a very active part in the development of the town of Cannes. Edward Bret is a sergeant of reserve in the 2*e*. *Groupe d'Ouvriers d'Aéronautique* at Istres, where he also acted as a fighting instructor during his military service.

He has owned a Moth for over twelve months, in fact he was one of the first French Moth-owners. Late this year he bought the special Moth with the Gipsy II engine which Mr. Butler flew in the King's Cup race and, in a modified form, in the Round Europe Contest. This, and his previous machine, he has kept on the Cannes polo ground, which has been made available for aircraft use through the influence of Commandant Bret, who holds an important post on the Municipal Council.

Through the influence of Bret *père et fils* Cannes has become a recognised Moth haunt.

Last year's *Coupe Zenith* was won by Mr. Hubert Broad, who, accompanied by Mr. Weedon, completed the Circuit of France with five compulsory stops at an average speed of 112.5 m.p.h. Mr. Broad flew a special Gipsy-Moth which he used, with slight modification, in this year's Round Europe Contest.

The success of two private-owners in this contest which is open to the entire light aeroplane industry of the World should give encouragement to the private flying movement in France. The success of the Gipsy-Moth in two successive years is very gratifying and the De Havilland company should be duly grateful to M. Bret, and to M. le Comte de Villefranche for putting up such brilliant performances.

The makers of the following have also a right to be proud of the part their products played in winning this excellent trophy:—K.L.G. plugs, B.T.H. magnetos, Dunlop wheels and tyres, Stanavo petrol and Castrol oil.

AN ANGLO-FRENCH SUCCESS.—M. Edward Bret, the winner of the 1930 Coupe Zenith des Avions Légers, in his special Moth with a Gipsy II engine. This machine was used by Mr. Alan Butler to make the fastest time in the King's Cup Race.

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# COMMERCIAL AERONAUTICS.

## BY CYPRUS TO THE EAST.

During September the Mediterranean Division of Imperial Airways organised a six-weeks' experimental service between Alexandria and Famagusta, Cyprus, with an intermediate stop at Haifa, Palestine.

This service, which has the support of the Air Ministry and the Government of Cyprus, has considerable significance. In the first place it represents the first attempt of Imperial Airways to operate a feeder service connecting the largest British Imperial possession in the Mediterranean with the England-India route. Secondly, with its growing importance as a great oil port (see The Aeroplane in 1924) and a future Naval base which may rival the importance of Malta not only as a repair and refuelling base but as our best means of defending the Suez Canal, Haifa may be a far more important British base for Imperial Airways than Egyptian Alexandria.

Cyprus, which was formally annexed to the British Empire in 1914, is being very rapidly developed under British rule, but at the moment it is probably best known as an ideal holiday resort for British residents in the Middle East and for wealthy Egyptians and Greeks. The products of Cyprus are mainly agricultural or mineral and these are being developed along scientific lines. Tenders are now open for the extension of Famagusta harbour, which when completed will be one of the finest in the Mediterranean.

The distances between Alexandria and Haifa and between Haifa and Famagusta are 330 and 185 miles respectively and the schedule times between these places for the Short Calcutta are 4 hours 10 minutes and 2 hours 20 minutes respectively.

The service began on Wednesday, Sept. 17 when a number of complimentary passengers, including members of the British and Greek press in Egypt, were flown to Famagusta. On arrival they were met by the General Manager of the Cyprus Government Railways who had a special train waiting to take them to the capital of the island, Nicosia. [Which is pronounced as a Londoner would pronounce "Nicko-see-yer."—Ed.]

From Nicosia they were motored to Larnaca where they were received by the agents of Imperial Airways, who gave a lunch party in commemoration of the inauguration of the service. After the lunch the party returned to Famagusta, where on Thursday evening they were entertained to dinner by the General Manager of the Cyprus Government Railways.

On the Friday morning at 06.00 the Calcutta left Famagusta on the return journey. Haifa was reached at 08.20 hrs. but the departure was delayed an hour owing to the difficulties of re-fuelling in the heavy swell of Haifa's open anchorage. Finally Alexandria was reached at 14.30 hrs. instead of the scheduled 13.40 hrs.

According to the schedule arranged a full 24 hours were allowed in Cyprus which would admit a business man from Egypt to complete a short engagement in Cyprus in three days.

The Cyprus Government Railways co-operated with Imperial Airways by providing a special train at Famagusta to meet all flying-boats and to convey the passengers to all parts of the island. The railway company was also appointed the traffic agents and temporary booking agents for the service.

In the absence of a wireless installation in the island a receiving set was installed as a temporary expedient in the office of the General Manager of the Railway to which positions were reported by telephony.

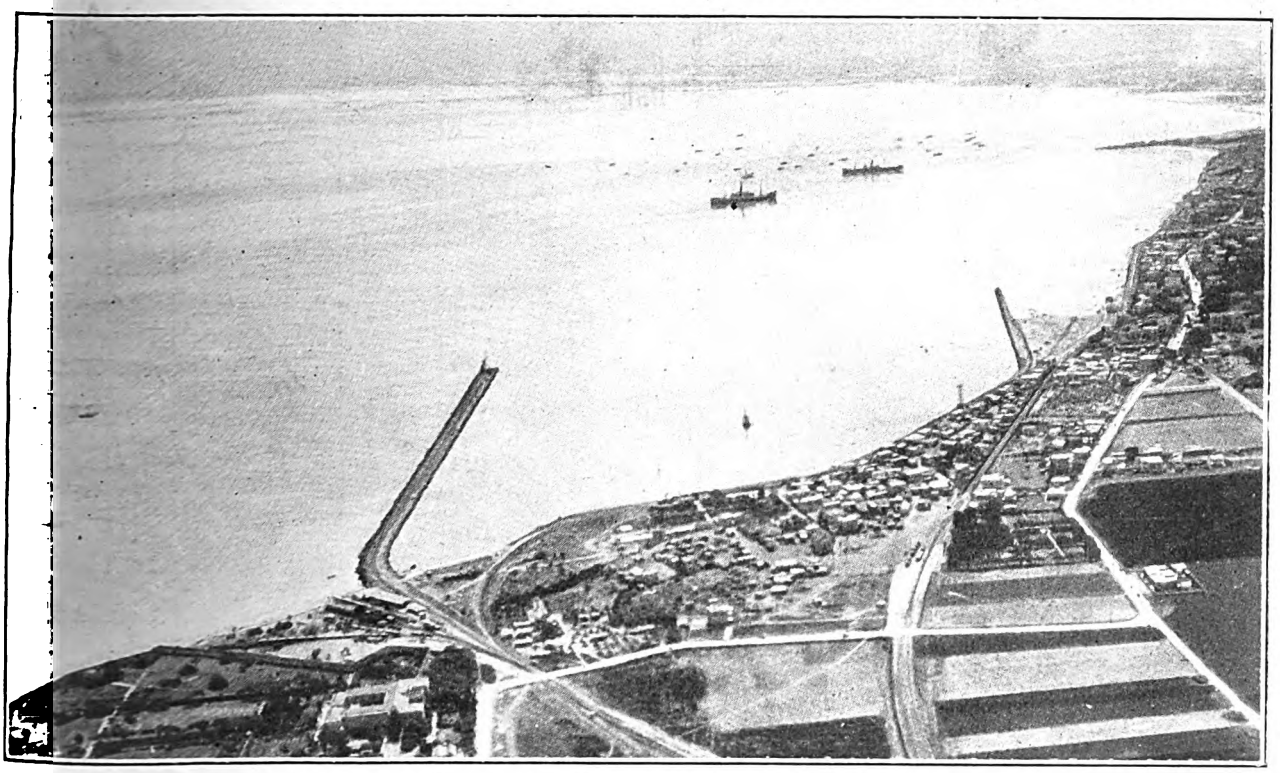
The other wireless stations used in connection with the service were Ras-el-Tin (the Alexandria station which operates regularly for the England-India route), and the Imperial Airways motor yacht *Imperia*. Both these stations were able to maintain communication with the flying-boat during its whole voyage from Alexandria to Famagusta.

A complete organisation for the dissemination of wireless weather reports from the Meteorological Office at Heliopolis was made.

A big harbour is being built at Haifa and a flying-boat could find secure anchorage behind the breakwater already completed. The lay-out of the present harbour, however, is such that it is not possible to take off or alight in it. The alighting area is in the open roadstead which is unprotected from N.W. to N.E. and when winds are in that quarter it would be untenable. These winds do not happen very often during the summer months and calm weather usually prevails up to the middle of October. Haifa, like most other ports on the Palestine coast which have open anchorages, cannot be considered as suitable for permanent use although it would be possible to operate during the summer months with a fairly high degree of regularity.

Famagusta harbour also presents difficulties for the flying-boat. The harbour is too small for landing or alighting and it is almost surrounded by shoals and a sunken breakwater. The alighting area is to the N.E. and N. of the harbour and it is unprotected from N. to E. With the strong winds that prevail from those quarters from November to March Famagusta could not be used by flying-boats.

As an alternative to Famagusta harbour when N.W. to E.



**HAIFA.—The new harbour works which are now under construction at Haifa taken from a Short Calcutta flying-boat.**

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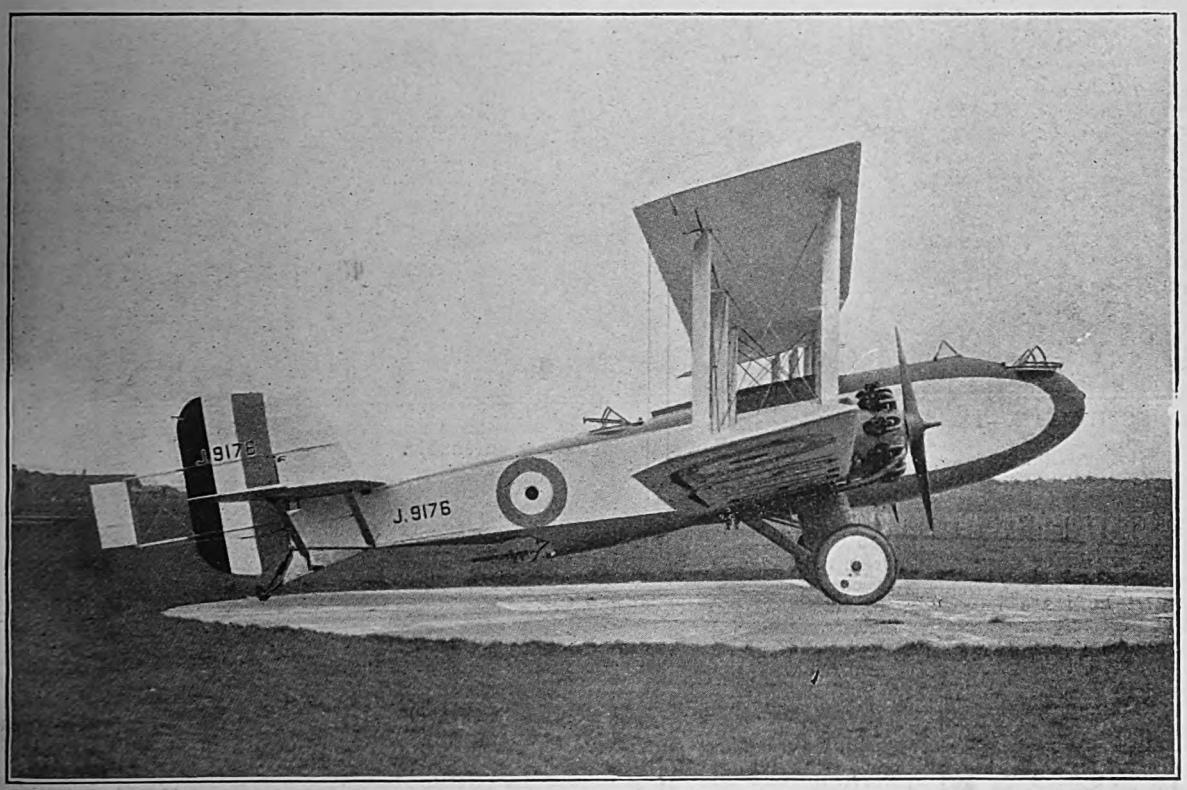


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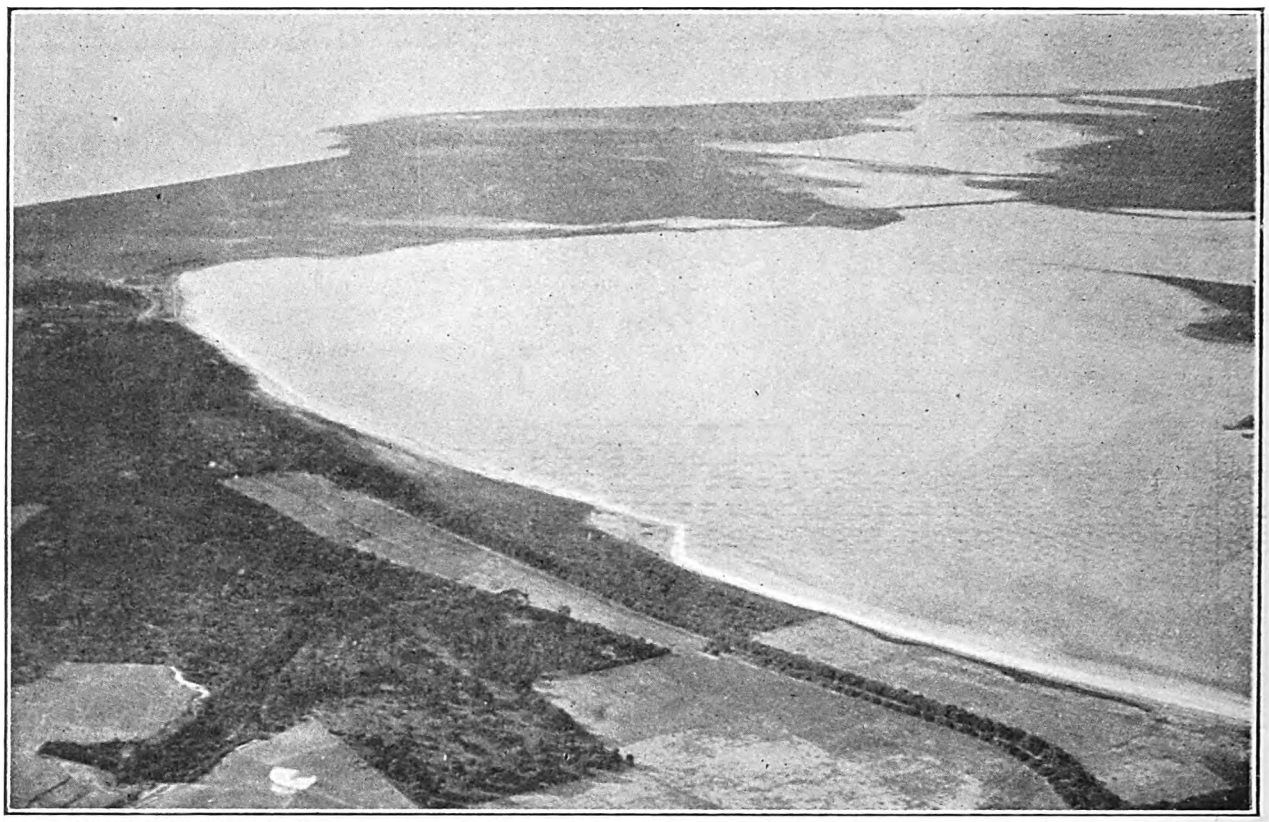

A POSSIBILITY.—The Salt Lake at Larnaca, which might provide an alternative alighting area for flying-boats when Famagusta is untenable.

of half a fathom throughout the year. As this lake is below the level of the sea it has been suggested that it should be connected by a dyke and the depth increased. A survey is said to be in progress to determine how much inundation would be caused by such an action.

Both Larnaca and Limasol are on the south coast of Cyprus and both are important towns ranking third and second respectively in population below Nicosia, the capital. Neither of them, however, is yet connected by railway to other parts of the island, and the roads are bad and mountainous.

The question of providing an alternative alighting area at Haifa, however, presents serious difficulties. An air survey of the Palestine coast has proved that there is little hope of finding such an area suitable for sea-going aircraft. The only solution seems to call for the use of amphibian flying-boats which would use land aerodromes in Egypt and Palestine and either Famagusta harbour or one of the lakes already mentioned at Larnaca or Limasol, in Cyprus.

During the season when Famagusta harbour is available amphibian aircraft could be used to connect other parts of the island not yet connected by railway with Famagusta and thereby contribute in a very practicable way to the development of the island.

The co-operation of the Government of Cyprus in the running of the present experimental service indicates that it is definitely interested in air transport. It is to be hoped that the findings and results of this experimental service will be applied to future establishment of a regular route which will bring Cyprus if not onto, at any rate into direct touch with the great Imperial Airways route to the East.

## AIR MAIL TRAFFIC GROWS.

The Post Office announces, according to *The Times* of Oct. 14, that 26,507 lbs. of letter air mail were carried out of England during the quarter ending Sept. 30, and shows an increase of 20 per cent. over the 22,507 lbs. carried in the equivalent quarter of 1929.

India shows the largest business in this line, and increased it 10 per cent. from 6,988 during the quarter in 1929 to 7,712 in the corresponding period this year.

The uniform combined charge for air fee and postage, which was introduced in June of this year, and the special air mail pillar-boxes, have had some effect in increasing the traffic. About 33 per cent. more letters went by air to European destinations than in the Sept. quarter of 1929.

The figures published by the Post Office in respect to the India service still leave an important feature to be explained. In the September quarter of 1929 the Indian Air Service, including Egypt, 'Iraq, Palestine, etc., carried 8,548 lbs., also, 3,430 lbs. between 'Iraq and Gaza are listed separately. This year the Gaza-'Iraq service is shown as "discontinued," but the Indian Air Service, which includes these regions, is credited with 11,547 lbs. of mail. Until something is made clearer the increase would seem to be illusory.

## BRITISH AIR MAILS.

A statement issued by the General Post Office disclaims certain of the criticisms made of its air mail policy by Sir Eric Geddes in a recent speech.

Sir Eric referred to the "wide and valuable assistance" given by the G.P.O. in the development of air mails, for which the G.P.O. express due gratitude, but certain other things he said meet with less enthusiasm.

They point out that Sir Eric's comparison of British and foreign Post Offices in the matter of fees was made under a misapprehension. The air fee charged to the British public to India is 5d. per half-ounce. In no case are foreign surcharges as low as that, as the air fee is 10d. in France, 7d. in Germany, 7½d. in Holland and 1s. 7½d. in Italy.

On a distance basis the comparison is even more striking. The French service to South America compares in distance with the British service to India. For that distance the French air mail surcharge is 4s. 2d. per half-ounce, or just 10 times the British charge.

The increase in freight and mails carried on the India route, quoted by Sir Eric as from 218,000 to 377,000 ton miles in the year, or 73 per cent., indicate that the service suffers little from excessive charges.

## THE NETHERLANDS EAST INDIES SERVICE.

Early in October the Royal Netherlands East Indies Air Lines started a regular weekly air service between Batavia and Medan. The journey will take 10 hours each way and will connect with the mail steamers of the Netherlands Steamship Navigation Company and the Rotterdam Lloyd.

The lines in operation are:—

Batavia to Bandoeng, twice a day, 110 km. (69 miles), 45 minutes.

Batavia—Semarang—Sourabaya, daily, 670 km. (420 miles), 4¾ hours.

Batavia—Palembang, weekly, 585 km. (365 miles), 3½ hours.

Batavia—Palembang—Singapore, 1,135 km. (710 miles), 7 hours.

Batavia—Palembang—Medan, weekly, 1,600 km. (1,000 miles), 10 hours.

Operations in the East Indies were started in 1928 with four Fokker F.VIIb.3m. aeroplanes (three Armstrong Siddeley Lynx engines). The fleet was gradually increased to seven machines of the same type. At the beginning of 1931 two 14-passenger Fokkers (three Pratt and Whitney Wasps) will be added.

From November, 1928. to July, 1930, the K.N.I.L.M. has flown well over a million kilometres with 100 per cent. regularity. Nearly 40,000 passengers have been carried,—among them His Excellency Sir Cecil Clementi, Governor-General of the Straits Settlements, on a visit to the Governor-General of the Netherlands East Indies, who himself uses the services on all his official tours.

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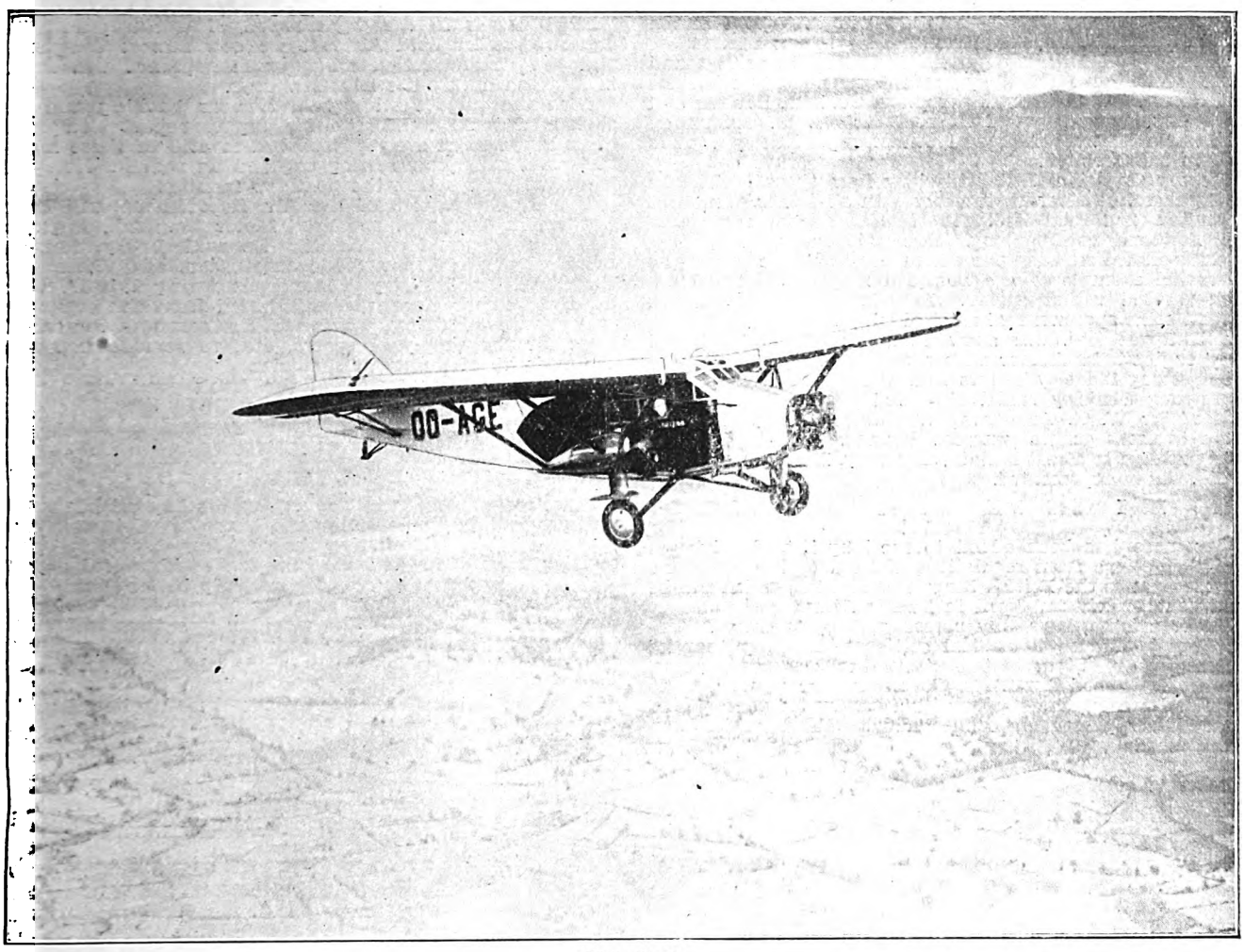


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## THE PARIS AERO SHOW.

The forthcoming Paris Aero Show will take place in the Grand Palais, Champs Elysées, from Nov. 28 to Dec. 14.

A number of British firms have decided to exhibit and those which have definitely made their plans are Vickers (Aviation) Ltd., the Bristol Aeroplane Co. Ltd., Boulton and Paul Ltd., Rolls-Royce Ltd., and Sir W. G. Armstrong Whitworth Aircraft Ltd. and Armstrong Siddeley Motors Ltd. in collaboration.

Vickers (Aviation) Ltd. will show four types of Vickers or Supermarine Aircraft, together with a number of models.

Boulton and Paul Ltd. will make a special feature of the Townend cowling ring. The exhibits will include a working model showing the action of the device as well as an actual example of the Townend ring installation on a high-powered radial engine. In addition, the firm will exhibit some specimens of all-steel wings.

Rolls-Royce Ltd. will show examples of the "F" and "H" engines, the former with a sectioned supercharger.

Armstrong Siddeley Motors Ltd. will show a full range of Armstrong Siddeley radial air-cooled engines and, on behalf of Sir W. G. Armstrong Whitworth Aircraft Ltd. an Atlas two-seat general purpose biplane.

In addition to Great Britain, Germany, Italy, Holland and U.S.A. will be represented.

## THE BRITISH EXHIBITION AT BUENOS AIRES.

One more has been added to the long list of privileges and exemptions from regulations granted by the Argentine Government to the British Empire Exhibition, which will be held next March and April in Buenos Aires.

Under existing laws, any person wishing to enter Argentina must produce a medical certificate showing that he or she has been vaccinated within the last seven years. The newly-formed Argentine Government is now about to issue a decree exempting from this regulation all first and second class passengers connected with the Exhibition, or tourists arriving in Argentina to visit the Exhibition. This concession will be of interest to many of the very large number of business men and others, in many cases accompanied by their wives and families, who will be visiting Argentina during the period of the Exhibition, and at the time of the Prince of Wales' visit.

It is a further proof of the anxiety of the new Government of Argentina to continue the policy of its predecessor in doing everything possible to encourage business and friendly relations with this country. We can only hope that the British Aircraft Industry, vaccinated and unvaccinated, will be well represented.

## SMOKING ALLOWED.

The Desoutter Mk. II monoplane has received official Air Ministry approval as an aircraft in the cabin of which smoking is allowed so long as a fire-extinguisher forms part of the equipment. The Desoutter is claimed to be the only small British cabin aeroplane which has this permission.

Imperial Airways have applied for permission to allow smoking in one of the two passenger compartments in the new Handley Page 42 forty-seater air-liners, eight of which are being built for use on the England-India air route.

## FORD AEROPLANES IN BRITAIN.

Final details in the organisation of a European sales organisation for Ford Aircraft are now almost completed, and two demonstration tri-motor monoplanes will arrive in England during the next few days.

With the huge Ford organisation as backing and the obvious demand in Europe for big transport aeroplanes there seems to be every prospect of several of these highly successful monoplanes being engaged on regular European transport work within the next few months.

The Head Quarters of the Air Department will be in London, in charge of the Ford Motor Co. Ltd., largely a British concern, of which Sir Percival Perry, formerly President of the Motor Trade Association, and Director of Traction in the Ministry of Munitions during 1918-19, is the head. The aeroplanes will be delivered from the company's own private aerodrome, which will also serve as the central store for the supply of spares, etc., to service depots in the majority of European countries.

The two most successful of the firm's products are the 4AT and 5AT models. The former, with Wright J.6 engines are sold with a guaranteed cruising speed of 107 m.p.h., has accommodation for eleven passengers and baggage. The latter has Pratt and Whitney Wasp engines and is sold with a guaranteed cruising speed of 122 m.p.h. The passenger accommodation in this machine is 14 and baggage.

There is interest in noting that one machine of each type will be available during the next few days for demonstration work. The 5AT machine is the identical aircraft which, stripped for the purpose, recently broke the World's Speed Record for its class, carrying a load of 2,000 kgs. at a speed of 164.4 m.p.h. The machine was then piloted by Mr. Le Roy Manning, who has come over to demonstrate it here. The many friends he made when in Europe last year will be delighted to see him again

An all-British staff has been engaged under the direction of Mr. G. W. Higgs, with Mr. Robt. L. Carter as his assistant. And there are unofficial rumours that Ford aeroplanes may actually be built, rather than assembled, in this country when the new Ford garden-city at Dagenham comes into being. Mr. Henry Ford recently had an interview with Mr. Ramsay MacDonald, which may or may not have bearings on the subject.

## WESTLAND ENTERPRISE.

The Westland Aircraft Works, which is a branch of Petters Limited, the famous Oil Engine manufacturers of Yeovil, Somerset, are making a determined effort to capture foreign business in the most practical way possible.

They are arranging for a demonstration Wapiti to be despatched during this month to China, where it will be on demonstration for six months in the hands of the Far Eastern Aviation Co., the firm's agents in China.

The Westland Works are also proposing to despatch a demonstration Wapiti of the latest pattern to give flying exhibitions in Buenos Aires at the time of the British Empire Trade Exhibition in that city in March and April of next year. This latter machine may also be demonstrated in certain other South American States.

Thereafter, other demonstrations are under considera-

**THE HAWK-MOTH IN CANADA.—Two of three D.H. Hawk-Moths (230 h.p. Armstrong Siddeley Lynx engines) which have recently been delivered to the Canadian Government standing outside the works of the De Havilland Aircraft of Canada Ltd. at Toronto. Short float undercarriages and ski equipment were supplied with the machines.**

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# VICKERS

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HAVE PRODUCED NEW TYPES OF

# COMMERCIAL AIRCRAFT

THE SINGLE, TWIN, AND THREE ENGINED

# "VIASTRA"

**12 SEATER ALL METAL HIGH WING**

# MONOPLANE

AND THE

# "VELLORE"

**TWIN ENGINED HIGH SPEED FREIGHT CARRIER**

# BIPLANE

DESIGNED AND CONSTRUCTED EXPRESSLY FOR

# RAPID TRANSPORT

OF

PASSENGERS, MAIL, AND FREIGHT

**DETAILED PARTICULARS AND ILLUSTRATIONS SENT ON REQUEST**

S·B·A·C THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS




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tion, as the firm realises the importance of giving practical proof of the performances of a product, if sales of British aircraft are to be obtained overseas.

The Wapiti is a standard "general purposes" type in the Royal Air Force, the Royal Australian Air Force and the South African Air Force, but a modified design differing from the standard Mk. II A type has been produced to fit it for Army-Co-operation duties.

This machine is designed for the installation of engines either of the water or air-cooled type. A longer fuselage makes it peculiarly suitable for army co-operation requirements, where very varying loads may have to be carried in the rear cockpit.

A new form of undercarriage has been designed which incorporates efficient wheel brakes. A Goodyear tail wheel of the Airwheel low-pressure type facilitates ground handling and enables the pilot to manœuvre with extreme exactitude without manual assistance.

A message-picking-up hook is carried below the fuselage, and the bomber's aperture has been increased to give a better field of view.

Other improvements include an increased wireless accommodation, collapsible windscreen for the observer, and an arrangement enabling the lap type parachute to be carried in a tray for immediate use.

The same policy of practical demonstration is influencing the Westland firm in connection with their latest civil product, the Westland Wessex three-engined six-seat cabin monoplane. A demonstration machine of this type is to tour the British Isles during the next two months.

Throughout October the machine will be touring the Eastern counties giving demonstrations, and the following month she will visit the Midlands and the North, including Scotland and Ireland, and opportunities for inspection will be given.

The company hereby hopes to bring home to the industrialists and big business concerns of England the strides that have been made in commercial aircraft, from the point of view not only of rapid transit, but of safe, comfortable and economical transport for directorates of firms, inspecting staffs, etc., both at home and overseas. Heretofore, business men have been hampered by the necessity of adhering to railway time-tables or proceeding about their affairs on crowded roads. The Wessex with its steady 95 m.p.h. cruising speed and its ability to fly with full load at least 4,000 ft. on any two out of its three engines, heralds a new era in communication in industrial districts.

Already four of these machines have been supplied to the Sabena Company, the well-known Belgian air operating concern, who are extremely pleased with them.

## THE LATEST SHORT FLYING-BOAT.

The latest Short boat-seaplane is being built to a specification which has been issued by Imperial Airways Ltd. as a result of their experience in the Mediterranean. One would therefore expect such a boat to be just about the last word in boat-seaplane design.

The new boat is a four-engined version of the Short Calcuttas which have been giving such a good account of themselves on the Salonika to Alexandria stage of the air route to India. Perhaps the most interesting innovation is the fitting of a stainless-steel bottom to the newest boat. This has already been successfully done to one of the latest Short machines, the Singapore Mk. II.

A bottom of such material, when it is extended to well above the waterline, removes the necessity for frequent inspection which is required if a duralumin sheet is used. There is interest in noting that the real difficulty in coping with corrosion of duralumin bottoms is not preventing the sheets from being affected, but the rivets. The closing up of the rivets by the hammer spoils the protective film, and makes them nuclei for the formation of corrosion. Stainless steel rivets used with stainless sheet do not give this trouble.

Another point of difference is that the pilot's cockpit is completely enclosed. There is a crew of three and accommodation for 16 passengers, chairs for whom are arranged in rows of four. Between the compartment for the radio operator and the cabin is a compartment, with a capacity of 1,600 kgs. (3,530 lbs.), for the transport of mails. The lavatory accommodation and baggage space will be as completely adequate as they were on the Calcuttas.

There will be special fittings on the hull so that the machine can be towed behind a ship. Another novelty will be the fitting of a quick-release hook at the stern so that the engines may be run up while the machine is moored to a buoy, and the machine can be let go with engines fully alive.

The engines will be four Bristol Jupiter X.F.B.M., geared air-cooled radials, arranged in four nacelles between the wings. These engines are moderately supercharged up to 5,000 ft., so the new flying-boat will have its best performance at this height. Arrangements will be made for the complete refuelling of both tanks from one fitting on the hull.

The weight of the machine empty, inclusive of cabin equipment, will be 17,900 lbs., the disposable load will be 12,410 lbs., and the weight loaded 30,310 lbs. (13½ tons). The estimated top speed is 132 m.p.h. at 5,000 ft., the cruising speed at that height is 100 m.p.h., and the landing speed 60 m.p.h.

Imperial Airways Ltd. seem to have insisted on this type so that they may use the same type of engine throughout their system. Otherwise a machine with four radial engines, each head-on to the air, cannot compare for performance with one like the Short Singapore Mk. II, with its four Vee-type engines in tandem pairs. The reason seems to be inadequate when we consider that speed is the essence of the contract in an air mail service.

## COMMERCIAL COMMUNICATIONS.

The following letter from the Civil Aviation Section of The London Chamber of Commerce will be found interesting:—

Sir,—I have read with interest the article entitled "Air Mail, Exports and Unemployment" in your issue of Sept. 24. You make the suggestion that the Society of British Aircraft Constructors might start a Commercial Communication Section. It has, I think, been overlooked that it was with the idea of urging upon the business community the importance of the development of Commercial Aviation to this country, that the Civil Aviation Section of the London Chamber of Commerce was formed in July, 1929.

This Section has amongst its members a large number of firms concerned in the British Aircraft Industry, whilst its Standing Committee includes many of the leading men in Civil Aviation in this country.

The Section has been in communication with British Chambers of Commerce abroad with a view to emphasising the importance of Commercial Aviation to this country and to the British Empire and undoubtedly keen interest has been awakened amongst these bodies all over the World in the development of Imperial air communications and of British air transport.

Appreciating that ground organisation must come first before there can be any real extension of civil flying either in this country or in the Dominions and Colonies, the Committee took up the question of the provision of aerodromes by Municipal Authorities. The opinion of various Local Authorities, in districts where aerodromes are most needed, was sought on the advisability of granting compulsory powers for the acquisition of land. The co-operation of Chambers of Commerce and other bodies was obtained and the Committee's views conveyed to the Air Ministry.

It is, therefore, interesting to note that the Public Works Facilities Act, passed by Parliament at the end of last session, provides that any Local Authority, which has power under the Air Navigation Act of 1920 to acquire land for an aerodrome by agreement, may be authorised to acquire land compulsorily for that purpose.

The importance of pushing forward with ground organisation has been impressed upon Local Authorities in all parts of the Empire through the Federation of Chambers of Commerce of the British Empire, whose Twelfth Congress was held in London in May of this year.

The Committee have throughout the present year been in frequent communication with the Postmaster-General on the subject of the Air Mail. They have been advocating increased propaganda for the more general use of the Air Mail and it is satisfactory to note that there is now a wider distribution of Air Mail leaflets which include a ready-reckoner, that a panel of Air Mail labels has been inserted in the 3s. books of postage stamps and that a number of blue Air Mail pillar boxes have been erected. The Committee have, however, been unable at present to persuade the Postmaster-General to utilise stamp cancellation dies for the purpose of advertising the Air Mail—a method which has proved most effective in other countries.

Proposals have been submitted to the Post Office for a uniform rate of surcharge for Air Letters to cover both postage and air fee and for a revision of the procedure adopted in the case of under-stamped air letters.

Suggestions have also been made for the inauguration of Non-Stop Night Flying Air Mail Services to important Continental centres about 1,000 miles distant from London which would mean a considerable saving of time in the delivery of the mails, both at the termini and at intermediate points en route, where they could be dropped.

I might add that the Postmaster-General has recently extended an invitation to the Committee for a discussion of the whole question of the Air Mail, when these various points will again be put before him.

It is evident that the activities of this Section of the London Chamber during the past year, along with propaganda from other sources, have not been without their effect in awakening a growing interest amongst business men and the general public in Commercial Aviation both in this country and throughout the Empire.

I should be obliged if you would give publicity to this letter in the next issue of The Aeroplane.

Yours faithfully,
A. de V. Leigh,
Secretary.

97, Cannon Street, E.C.4. Sept. 30, 1930.

## "AEROPLANE" POSTCARDS.

Sets of six "Aeroplane" photographs printed on postcards may now be had from The Aeroplane Photograph Department, 175, Piccadilly, W.1, at 2s. a set post free.

Each set contains a flying photograph of the Bristol Bulldog, the Hawker Hart, the Hawker Horsley, the Boulton and Paul Sidestrand, the Fairey III F, and the Westland Wapiti.

This set is known as "Set A," and further sets will be available from time to time.

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# Another ATLANTIC FLIGHT

Capt. Errol J. Boyd and Lieut. H. Connor have flown across the Atlantic from Harbour Grace to Croydon, via the Scilly Isles. Their machine, a Bellanca Monoplane. "Columbia," had already crossed the Atlantic on a previous flight. Capt. Boyd and Lieut. Connor chose to rely on Shell products.

# SHELL

## AVIATION PETROL AND

# SHELL OIL




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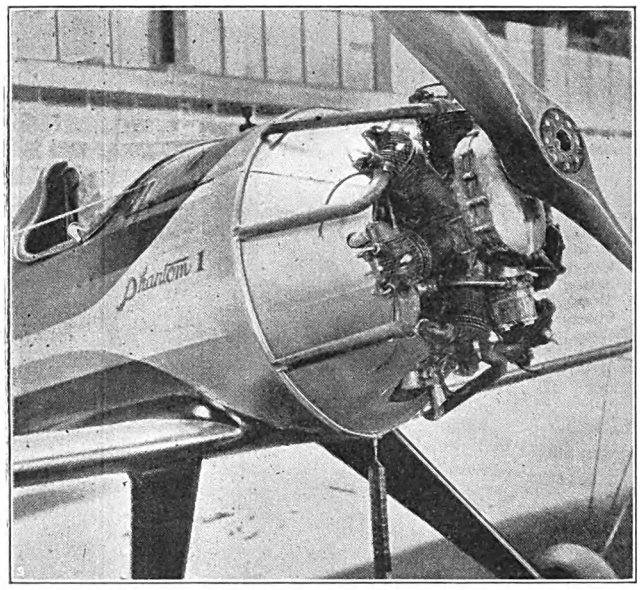
## SARO STORMWORTHINESS.

A business journey to Jersey from Southampton was made recently by Sir Alliott Verdon Roe, Mr. John Lord, Sq. Ldr. Underhill and Mr. Scott in the Saro Cloud (two Wright Whirlwinds). A woman passenger and a mechanic were also occupants of the machine on its journey, the outward half of which took one hour and ten minutes. Coming home was less easy.

The start was delayed by a torrential thunderstorm and further by absence of any available weather report except gale-warnings, which flew at all the prescribed points. Eventually the party decided to come home anyway, and set out in a full gale and very indifferent visibility. The view improved as time went on, but the wind was such as to arouse the warmest sympathy of those on board the Cloud for the occupants of Channel steamers, whose flounderings were observed from an altitude of 100 ft. Southampton was reached in two hours. [Which is all very fine; but if they had come down in that sea they would not have lasted for ten minutes,—nor would any other seaplane (float or boat). People of importance and/or eminence like Sir A. V. Roe and Mr. Lord ought not to do such things. The advantage weighed against the risk simply is not good enough.—C. G. G.]

Kirsten and Mace Ltd. are running a regular and efficient service between Southampton and the Channel Islands with their Cutty Sarks.

A high-speed piece of work was also done quite recently in response to an urgent telephone call to the Saunders-Roe offices, when some important documents were sent by air to their Cowes aerodrome, carried by car to a fast boat, which delivered them on board the *Europa* in mid-Solent.




## THE INVERTED HERMES.

The inverted version of the famous Hermes is well advanced in the experimental stages. To begin with, it has all the features of the Hermes II, which already has such feats to its credit as the trip of Mr. Edgar Percival in the Hendy 302 to Cannes and back at an average of nearly 130 m.p.h. Secondly, it has been turned over in its cradle to bring in the advantages which are provoking so much inverted design in the United States and elsewhere. [And as advocated in The Aeroplane for the past five or six years.—Ed.]

At present the experimental model is mounted in a Mark I Desoutter, which naturally permits few of the advantages of inversion as compared with the Mark II, but does very well as a flying test-bed. Even so, the view is somewhat better than with an upright engine and the noise sensibly less.

We flew the said combination at Heston recently, and are inclined to think that the particular model takes off rather better than others we have flown casually. This is merely an impression gathered from flying it and watching others do so, but it is fair to remark that all these flights were made with the machine light. On the other hand, the inverted engine is not yet giving full revs. because of the intake position. The pipe seems to be in an eddy and cannot inhale a full charge for anything over 2,000 r.p.m. At that speed, which is nearly 150 revs. below the calculated maximum, the engine is very smooth indeed and the aeroplane cruises at 100 m.p.h. There are a few slightly rough spots below it, but they are by no means bad, even with the solid mounting at present in use, instead of the André buffer mounting which is used in the Mark II Desoutter.

The hanging Hermes idles smoothly and picks up instantly. We found the throttle a little apt to work itself off the extreme positions unless watched, but that is a matter entirely apart from the engine and easily remedied. We look for much from this new Cirrus effort.—F. D. B.

## THE LONDON AEROPLANE CLUB RAFFLE.

The London Aeroplane Club is holding a raffle for Three Aeroplanes:

*1st Prize.*—Entirely new D.H. Puss-Moth, 1931 model, fully equipped with all instruments and fitted with Air Brakes, Air Wheels and Wheel Brakes.

*2nd Prize.*—Second-hand D.H. Moth, Cirrus Mark II, fitted with Slots, Compass, Telephones, etc., Dual Control. Current Certificate of Airworthiness.

*3rd Prize.*—Second-hand D.H. Moth, Cirrus Mark II, fitted with Slots, Compass, Telephones, etc., Dual Control. Current Certificate of Airworthiness.

Each aircraft will be painted in any colours desired by the winner.

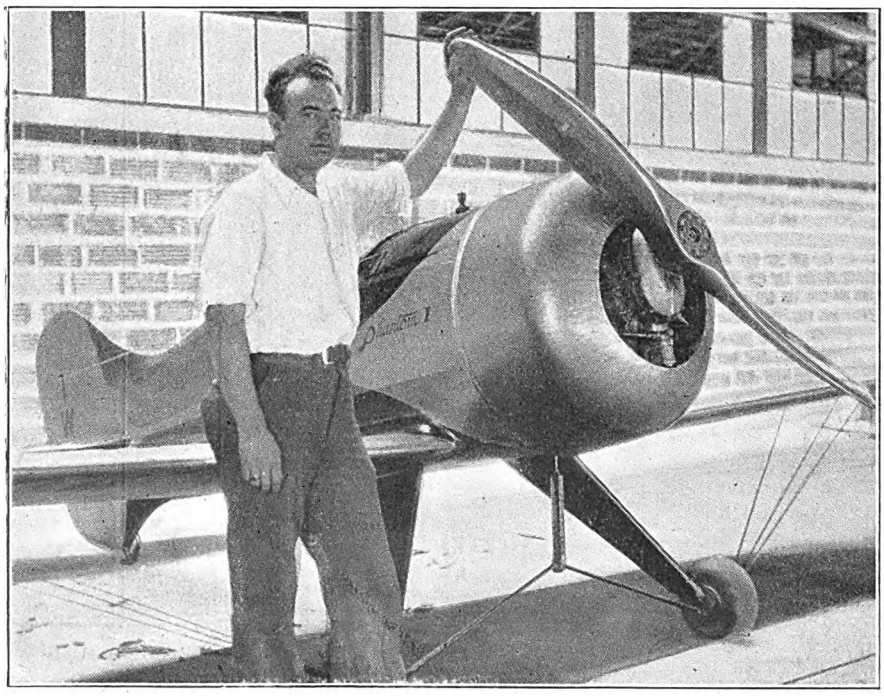
Tickets 10s. each.

In order to meet the requirements of the various Clubs in the Dominions, a certain number of tickets will be reserved for them until Dec. 31, 1930.

Applications for tickets should be made to The London Aeroplane Club, 3, Clifford Street, London, W.1, or at Stag Lane Aerodrome, Edgware.

The flying time of The London Aeroplane Club during the past three months shows a steady increase over that of last year, and 21 members have qualified for their "A" Licences.

The question of providing more commodious premises at Stag Lane has been exercising the minds of the Committee for some time and it is hoped shortly to complete these negotiations so that the new quarters will be ready for occupation before Christmas.




**THE POBJOY ENGINE IN THE U.S.A.—The two accompanying photographs show various views of a small racing monoplane, known as the Phantom I, which was built by the Nicholas-Beazley Airplane Co. Inc. of Marshall, Mo., U.S.A., specially for the Pobjoy "P" type radial engine. The engine in this machine is the very first one, on which all the experimental work was done. This engine also survived the original type-tests. Since it has been in the U.S.A. it has stood up to racing and speed tests for over a year and the Nicholas-Beazley Company write that "most assuredly it is much more efficient than anything in this country at the present time, or in any other country." This little machine has been credited with a speed of 170 m.p.h. The extremely effective way in which the engine has been cowled is noteworthy.**

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# The Avian's latest triumph

# A RECORD

## for Light Aeroplanes

## Wing Commander

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# AVIAN SPORTS

from England to Australia

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# TRADE NEWS

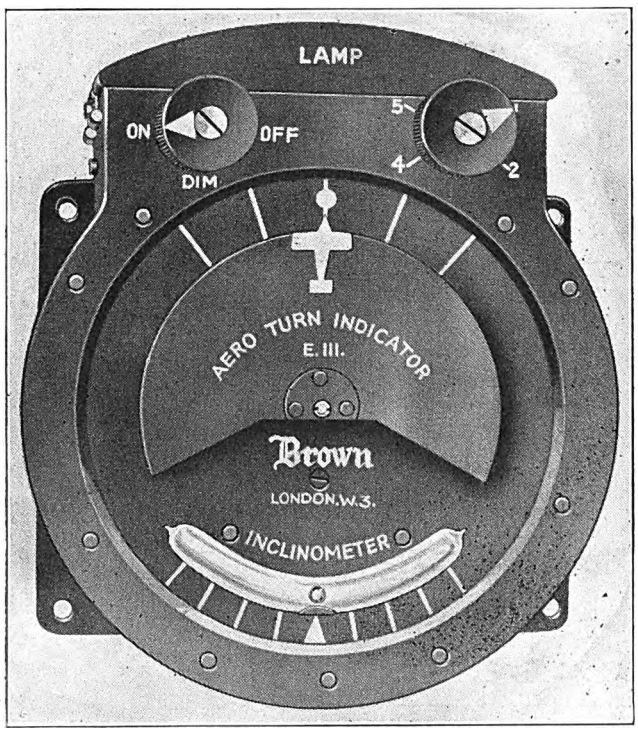
## A NEW STAR ON THE HORIZON.

The gyroscope has perhaps contributed more to safe navigation by sea than any recent discovery. In its early days it received much publicity as presenting a means of making single-wheel transport possible; but in this capacity the gyroscope has not rendered its greatest service to mankind. The queer habits of a rapidly spinning wheel mounted so that the supports can be moved in any direction without affecting the axis of the wheel have been used for a variety of purposes. Perhaps the most important of these are their use in a compass.

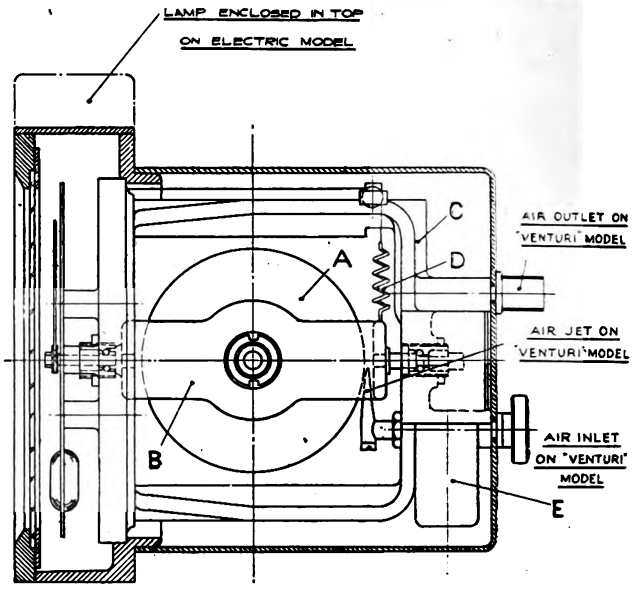
In this country no name is more closely associated with the development of gyroscopic compasses than that of Mr. S. G. Brown, who has devoted many years of work and enormous sums of money to research into problems connected with gyroscopic compasses. Unfortunately Mr. Brown is up against the "marine mind" which is not rapid, nor is it able to see when a new invention is likely to be of benefit to itself. This "marine mind" unhappily is more conspicuous in this country than abroad where Mr. Brown's talents are more appreciated.

There is one side of Mr. Brown's activities that is appreciated, and that by millions of people. His firm produces what many consider the best ear-phones and loud-speakers in the Radio Market. In fact one believes that there is good reason for saying that S. G. Brown Ltd., were the first firm to put a satisfactory loud-speaker on the market at a reasonable price.

The Air Ministry do not consider a gyroscopic compass, or so one is informed by the firm, fit for use in aircraft because of its weight and size. Other Governments do not share this view and recently one saw a gyroscopic compass made by S. G. Brown Ltd. which with two repeater compasses only weighs 15 lbs. This compass was going to Italy. One sees no reason why such a compass could not be carried on long raids by the leader of a bombing squadron to ensure absolutely correct navigation.




The Brown Turn Indicator.




**HOW IT WORKS.—"A" is the spinning wheel and "B" its mounting to which is attached the indicator.**

The gyroscope is also used for turn indicators and artificial horizons. S. G. Brown Ltd. have just produced a most amazing instrument of the latter type, which is electrically driven and weighs four pounds. This instrument has a mirror which is set parallel to the fore and aft axis of the aeroplane when the latter is flying on a level keel and not rolling.

The mirror is part of a gyroscope which is spun at 7,000 r.p.m. and mounted at the fulcrum of a pendulum. To give the gyroscope three degrees of freedom the pendulum is slung in gimbal rings. To remove any errors in the truth of the pendulum it is turned slowly round by a very small motor.

The whole instrument is mounted in a binnacle which has a sloping ground-glass screen upon which are marked a number of concentric circles. A spot of light is deflected by the mirror onto the screen.

When the instrument has been set, the spot of light is at the middle. If the nose of the machine is put down the spot of light travels downwards, if the nose is pulled up the light goes the same way. If the machine is banked the light travels to the appropriate side. The only movement the artificial horizon does not record is that of yawing. This is taken care of by the turn indicator. But with the artificial horizon one can hold the machine in a steady glide, so this instrument, a turn indicator, and an instrument which would give exact height above the ground, would make a fairly full equipment for fog-flying.

The gyroscope is also used in the turn indicator and a new instrument of this class has just been put on the market by S. G. Brown Ltd. This Brown Turn Indicator is extremely light and compact. The name of its makers is enough guarantee of its accuracy. It can be had either wind-driven through a Venturi or with an electric drive. In both forms the overall dimensions are approximately 4 in. all ways and both weigh 1 lb. 7 oz. The great advantages of the electrically-driven type, which runs off a 12-volt D.C. supply and consumes about .5 amps., are that *it has no effect on a magnetic compass,* and has no Venturi tube to be blocked by snow and ice.

Each model has two knurled knobs at the top of the dial. One turns the instrument on and off. Also in the

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USED BY THE LEADING AIRCRAFT MANUFACTURERS THROUGHOUT THE WORLD.
TELEPHONE. BISHOPSGATE 5641 (4 LINES)
MANUFACTURED TO SPECIFICATION 3.V.3. BY.
THE AERONAUTICAL & PANEL PLYWOOD Co. LTD 218/226, KINGSLAND Rd. LONDON. E.2.
TELEGRAMS: VICPLY, KINLAND, LONDON.

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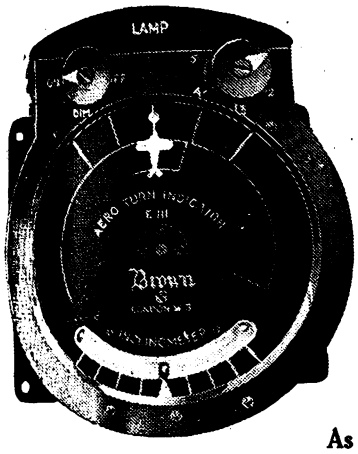
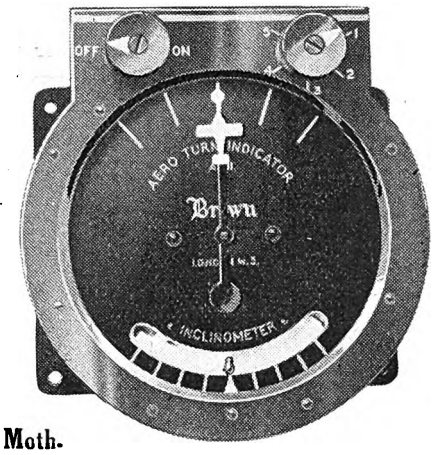



# The NEW Brown AERO TURN INDICATOR




**As supplied as a standard fitting to De Havilland Puss Moth.**

## ELECTRIC MODEL

A scientifically-made precision instrument. Its weight is only 1 lb. 7 ozs., and its size is 4 ins. cube. The electric model consumes only ·5 ampere at 12 volts, and has no effect whatever on the magnetic compass. A striking example of British workmanship.

*"As British as Britannia."*

## AIR-DRIVEN MODEL

The Air-driven Brown Aero Turn Indicator is identical in weight (1 lb. 7 ozs.) and size (4 in. cube) to the electric model. "On-and-off" control for air supply enables instrument to be started and stopped in the air.

The Brown Aero Turn Indicators, like the Brown Air Gyro Compass, the Brown Air Artificial Horizon and the Brown Air Electro Megaphone, are the sole productions of:—

**S. G. BROWN, Ltd.,** ***Air Instrument Manufacturers,***
**Western Avenue, N. Acton, London, W.3,**

# THE ONLY BRITISH GYRO COMPASS MAKERS

♡ 6478

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***ARE STANDARD EQUIPMENT IN THE*** **ROYAL AIR FORCE**

***AND ARE ALSO USED BY ALL THE LEADING BRITISH AIRCRAFT MANUFACTURERS INCLUDING:—***

**Sir W. G. Armstrong Whitworth Aircraft Ltd.,**
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**Cierva Autogiro Co. Ltd.,**
**De Havilland Aircraft Co. Ltd.,**
**Fairey Aviation Co. Ltd.,**
**Gloster Aircraft Co. Ltd.,**
**Hawker Engineering Co. Ltd.,**
**A. V. Roe and Co. Ltd.,**
**Short Bros. Ltd.,**
**Spartan Aircraft Ltd.,**
**Supermarine Aviation Works Ltd.,**
**Vickers (Aviation) Ltd.,**
**Westland Aircraft Works,** ***and***
**National Flying Services Ltd.,**
***etc., etc.***

***ALL IRVIN AIR CHUTES ARE APPROVED BY THE BRITISH AIR MINISTRY.***

**IRVING AIR CHUTE OF GT. BRITAIN, LTD.,**
**LETCHWORTH, HERTS.**

*Telegrams: Irvin, Letchworth.*
*Telephone: Letchworth 370.*




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electrically-driven model it controls the strength of the electric lighting,—for in the latter model the rate of turn is shown by the amount of green or red light shown on the face of the instrument. The other knob controls the sensitivity of the instrument so that it is possible to use the same instrument for fast high-speed machines or slow-moving transport.

The prices are not excessive. Information about them may be had from S. G. Brown Ltd., Western Avenue, N. Acton, London, W.3.

### DARDELET SECURITY.

People in the Aircraft Industry are perhaps better acquainted with the need for a self-locking nut than anybody else. Every bolt and nut in an aeroplane has to be secured, and there are many ways of doing this. Perhaps the most widely used methods are burring over the thread, and the use of castellated nuts with split plins. These are effective, and perhaps the first is the least trouble. This has the disadvantages that the bolt has to be properly supported if the part is not to be damaged by the blows of the hammer, and, further, that once on the nut cannot be removed without damage.

The Aircraft Industry would be extremely interested in a bolt and nut that would allow rapid assembly and at the same time when tightened would remain in that state, but the Industry would have to be convinced that such claims were proven. For there have been many attempts to introduce self-locking nuts on the market.

A bolt and nut of this type are being made by the British Dardelet Threadlock Ltd., who have some reports from the National Physical Laboratory which are very strong evidence in support of the claims which the firm make for their system. These tests were made at Teddington in the early part of this year. Test-pieces were used of mild and free-cutting steels. These had Whitworth and B.S.F. threads for comparison with Dardelet threads on the same diameter.

In the tensile tests where the load was applied to the nuts the Dardelet threaded pieces were undamaged, whereas the Whitworth and B.S.F. threads failed, and these test-pieces broke right through.

A tensile-impact test was made of similar specimens, and once again the Dardelet thread proved its superiority. On the average, it was about 71 per cent. stronger than the Whitworth.

Perhaps the most severe test, and one which is the most important from the self-locking point of view, was the vibration test. This was made on a special machine and lasted for 70 hours. During this time so rigorous was the test that four bolts and a bar in the testing machine had to be replaced.

The Dardelet nuts and bolts were marked, but during the test no motion of the nut upon the bolt could be detected. The report says that the bolt should be retightened after a short period of running.

The principle of the self-locking device has all the simple ingenuity of genius. The threads of the nuts are half the size of the grooves in the bolt. Thus, when the nut is loose it revolves easily and can be run down the bolt very quickly indeed. The base of the groove on the bolt is inclined so that the groove is considerably shallower at its top end. Thus, when one runs the nut down against its seating the thread of the nut is forced along until it binds tightly against the sloping base of the groove.

### BRITISH OIL PRODUCTION.

Mr. Alexander Duckham has just returned from a visit to his oilfields in Trinidad, which island, by the way, is the largest producer of petroleum in the British Empire. The main object of his visit was to investigate the high-pressure gasses which have hitherto rendered production from deep sands not only very problematical but also hazardous to life. The fact that the pressure registered on instruments in some cases exceeds 2,000 lbs. per square inch will give the mechanically-minded some idea of the immensity of the problem.

Mr. Duckham reports that the introduction of muds superweighted with heavy powders such as barytes have gone far towards harnessing these pressures, and that consequently greater productivity will probably result therefrom.

It is interesting to note that wells explored to greater depths have shown that oils exist in greater quantities considerably deeper than the sands at present under development. The deepest exploratory well so far is more than 6,000 ft. and even that has not exhausted the depth of the petroliferous formation.

The value of these investigations carried out by Mr. Duckham, who was one of the pioneers of the Trinidad Oil Industry, cannot be over-estimated.

### EDUCATING THE IGNORANT.

A seven-foot diorama of Croydon aerodrome, not previously exhibited, is shown by the Pratts Petrol people in the National Hall, Olympia, at the Motor Show. The whole of the aerodrome is represented in miniature, including the firm's aeroplane service station and other filling points, where models of air liners are shown filling up. A prominent feature of the stand is a full-size petrol pump plated with real gold which visitors are invited to use as an easily found rendezvous.

### A GOOD RECORD.

Desoutter aeroplanes have now flown over a quarter of a million miles without an accident involving serious injury to anyone.

The first production Desoutter monoplane came out of the works in November 1929, so that this excellent record has nearly a year's standing. In the intervening period Desoutter aircraft have been used for all kinds of serious cross-country and cross-ocean flying, so that this record cannot be said to have been maintained by careful aerodrome flying.

### A SOUND SOURCE OF SUPPLIES.

The question of adequate service for the owners of light aircraft is beginning to receive a lot of attention. The more go-ahead firms realise that the day is coming when the opportunities of which they took advantage in the Motor Trade will be there for them to take in the Aircraft Industry. Among these enterprising concerns is that of Frederick J. Gordon and Co. Ltd., of 92, Charlotte Street, W.1. whose name is well-known in the Motor Trade.

This firm are agents and distributors for a big range of well-known products. They market Van Dorn Electrical Equipment, which includes Electric Drills, Tappers, Screwdrivers, Socket Wrenches, Portable and Bench Grinders, Hammers, and Valve Griding Equipment. Useful equipment for the aircraft manufacturer is the H.B. Portable paint-spray apparatus. This unit is quite self-contained and is electrically driven. The electric motor and compressor is mounted on top of the container which is on castors, so that the whole unit can be pushed about as wanted.

### THE NAPIER RAPIER.

Rumour has it that the 300 h.p. Napier "H" type air-cooled engine, which is virtually four four-cylinder units driving two crankshafts and one airscrew shaft, is to be called the Rapier. The first engine of this type, which was designed by Major H. B. Halford, is installed in the De Havilland Intercepter Fighter.

### TO OWNERS AND OPERATORS OF GIPSY II AND GIPSY III AERO-ENGINES.

The De Havilland Aircraft Co. Ltd. wish the following notice to be brought to the attention of all owners and operators of Gipsy II and Gipsy III engines:—

CRUISING SPEED OF ENGINES.

The Airworthiness Handbook, Air Publication 1208, Design Leaflet D.1, Paragraph 8, states: "An engine-speed warning-plate showing the normal and maximum r.p.m. *as specified in the Certificate of Airworthiness* must be fitted on the dashboard in the pilot's cockpit."

The Certificate of Airworthiness stated: "The speed of the engine must not exceed 2,000 r.p. except for short periods. It must never exceed 2,200 r.p.m. and must not be maintained at that figure for more than five minutes at a time." (N.B.—The figure of 2,200 r.p.m. has recently been increased to 2,300 r.p.m.)

The De Havilland Aircraft Co. Ltd. wish to make it clear that the normal figure quoted above has no bearing on the practical operation of the engine and should therefore be disregarded. In the interests of owners and operators of machines fitted with these engines, and in the interests of the De Havilland Aircraft Co. Ltd. as manufacturers of these engines, the Company hereby advise and recommend that the most suitable cruising speed of both these engines is between 1,800 and 1,900 r.p.m. At this speed and using a suitable airscrew petrol consumption should be 5-5½ gallons per hour.

Fit "TripleX" Regd -and be safe!
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Spartan Aircraft Limited have met this demand with a distinctive type. Operators of the three-seater Spartan have testified to its suitability for commercial and private purposes. In exacting service the machine has proved that it possesses all the robust qualities associated with other Spartan aircraft.

*Flight* on September 26th last stated that "Its performance is even better than some two-seaters. The take-off is all that could be wished for, as is the climb, while the slow sinking speed, combined with a fairly steep gliding angle, allows the machine to be landed in very small fields."

For joy-riding and taxi work the Spartan has proved to be particularly successful both as a landplane and light seaplane.

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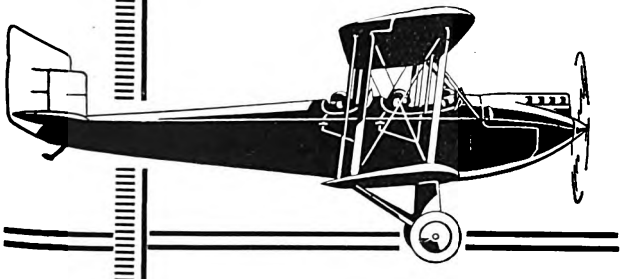

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| Top Speed - - - | 100 m.p.h. |
| Rate of Climb - - | 750 ft.p.m. |
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| Landing Run - - - | None |

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MANY INVENTIONS.

On Thursday last M. Laurent Eynac, the French Air Minister, General Barés, of the *Armée de l'Air*, and M. Chaumié, the D.C.A. of France, arrived by Air Union at Croydon and were met by Mr. Montague, Under-Secretary of State for Air, representing His Majesty's Government, Air Commodore Mitchell, representing the Royal Air Force, and Mr. Webster, representing the Air Ministry. In the absence of Major Richard they were received on his behalf by Mr. Lawford.

On Monday, Oct. 13, Herr Doktor Eckener left Croydon for Flushing, where it is understood he had a connection to catch, in a special Desoutter (inverted Gipsy) belonging to the Desoutter Co. and piloted by Mr. Styran. The movements of these well-known personages were in connection with the Memorial Service for the R.101 victims.

Representatives of foreign Civil Aviation companies in this country were somewhat surprised not to receive invitations to represent their companies officially at the Memorial Service. Many of them had been connected with Civil Aviation since its inception in England, and naturally they desired to pay a last homage to those who died for British Aviation. Certainly this opportunity was not afforded them spontaneously, and those who made applications only received tickets after some difficulty. Several foreign firms were therefore unrepresented, one of them being the oldest consistently operating air traffic company flying to this country.

Last week it appears we made an error in associating Mr. Kennedy, late of Walcott Air Lines, with Personal Air Service Ltd., with which firm he has absolutely no connection. The mistake was due to a misunderstanding of a conversation and was really nobody's fault. We hereby apologise to all concerned.

A few days ago some excitement was caused in official circles by a report that a new type amphibian with folding wings had landed on the aerodrome. After serious efforts had been made to collect a landing fee, it transpired that the thing was a young swan (doubtless from the Sugar Loaf).

The Ford Company, represented by Mr. G. W. Higgs, who is European sales manager, has a couple of machines crossing the Atlantic by the somewhat unusual means of boat transport. It is understood that they will be here within a few days and will pass through Croydon on their way to the Continent for demonstration flights. One of them is the Ford A.T.4 (three J.6 Whirlwinds), and the other is the high-speed model Ford A.T.5 (three Pratt and Whitney Wasps). The latter is the holder of the world's speed record for commercial aircraft, with a speed of 164.44 m.p.h. It has other attractive features, and its arrival at Croydon, with the always-popular Mr. Le Roy Manning, is awaited with interest. Mr. R. L. Carter, late of Imperial Airways, has joined the Ford Company as assistant European sales manager, and Mr. Barnett, well known at Croydon Aerodrome, has gone to the firm as ground engineer.

In the sports column of *The Daily Express* for Oct. 8 a well-known sporting writer gave an account of an air trip to Paris which apparently impressed him favourably. Nevertheless he wrote the following remarkable lines, which are quoted exactly as they appeared, "I did not have the nerve to walk up to the pilot and shake his hand, but that was what I wanted to do. I fancy I was stopped by the remembrance that one does not clasp the hand of an engine-driver."

Quite, quite, Major, these social problems are really devilish difficult, what? Your dilemma reminds one of that of an air line pilot who, descending to the servants' hall one Yule Tide, full of bonhommie (old French for port) shook hands cordially with the butler, bootboy, buttery wench, and so on, and then found himself confronted by the alarming problem of clasping the hand of a sporting reporter on some newspaper. The butler apologetically explained that the rules of the social circle below stairs had been relaxed in this case owing to the festive season, the fact that the man was the black sheep of the fourth footman's family and because he was walking out with one of the under-housemaids (a headstrong lass named Emma). He added that it should not occur again, and that, anyhow, the reporter had promised to lead a more respectable life in future.

Did the pilot hesitate? Not he! ! Merely pausing to don the steel gauntlet of a crusading ancestor, he wrung the newspaper man so warmly by the hand that the latter wrote left-handed for the rest of his life. Do not be nervous next time, Major, but advance confidently upon the pilot, carefully wiping the palm of the hand on the seam of the trouser before proffering it. After all, the pilot is a human being and may possibly condescend to clasp it.

With apologies to Mr. W. B. Wyndham Lewis, the follow-


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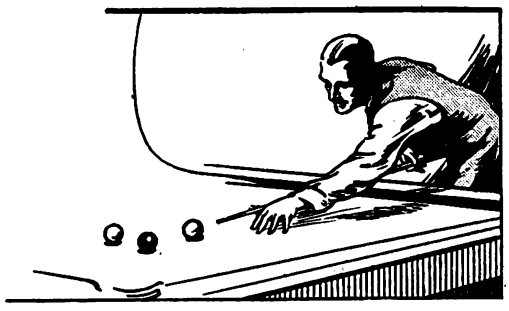

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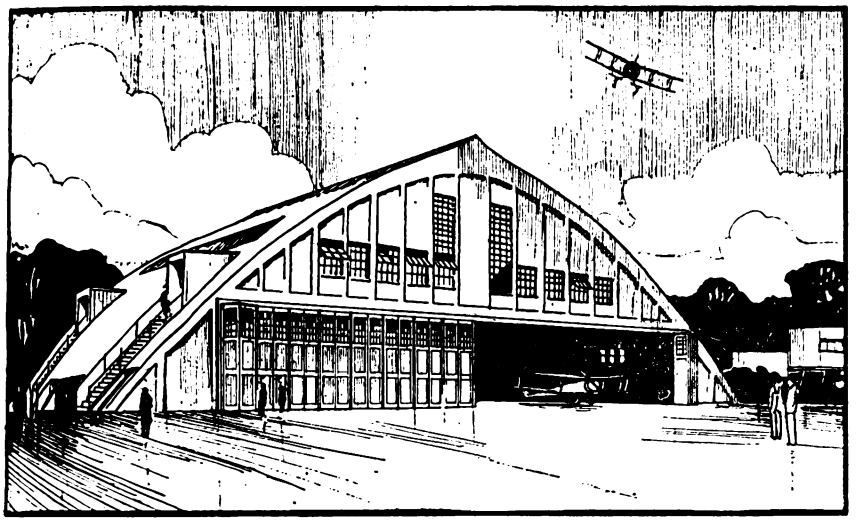
# THE AEROPLANES' HOME NEEDS A BIG FRONT DOOR



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Aeroplane Hangar at Heston Aerodrome enclosed with Esavian Folding and Sliding Doors, fitted with Winding Gear.

The Esavian Doors as illustrated are 100 feet long and 19 feet high. They can be opened and closed easily by one man by means of the patent Winding Gear.

Esavian Doors with Winding Gear have been fitted to openings 32 feet high and 100 feet wide, and, owing to the way in which the Winding Gear operates, they can be opened and closed whatever the wind pressure.

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"If the machine had had slots it certainly would not have spun and he might have sat it down flat."

"The Aeroplane,"
10th September, 1930.

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ing soothing Split Second, probably the last which will appear in these columns for fear of *The Daily Mail*, is given for what it is worth. Two airmen happening to land at Fresco, one of the Stilly Isles, after a trans-Atlantic flight, accosted an aged inhabitant who was devouring winkles *al fresco* (Italian for with a pin) on the seashore.

"Say Bo," said the aviators, "Guess we'e just flown the Atlantic."

"Oh, yeah?" replied the old gent cynically, "*and* why?"

*Query.*—What should the aviators do?

*Answer.*—Abolish the Ancient as no advocate of Modern Progress and beat it quick to Croydon, where unthinking hordes of Pressmen await, quite ready to accept any excuse for the deed without question. (*Note.*—The characters in this drama, except the winkles, are all fictitious.)—SPRY.

## AN OPPORTUNITY.

Flying Clubs in need of an Instructor are invited to write to THE AEROPLANE for the name and address of a pilot who has recently left the R.A.F. with exceptional qualifications. He holds a Central Flying School A.2 certificate and has been instructing at one of the Flying Training Schools. He has had experience on eight different types of machines and holds an "A" Licence. He was an engineer before joining the R.A.F. and is willing to go abroad.

Letters should be sent to the Editorial Office of THE AEROPLANE and marked "Instructor."

## NEW COMPANIES.

AERIAL PHOTOGRAPHS LTD.—Private company. Registered in Edinburgh on Oct. 7. Capital, £100 in 1s. shares. Objects: To carry on the business of photographers and dealers in photographs of all kinds, lithographers, engravers, advertising and publicity agents, etc. The subscribers (each with one share) are: R. Ralston, 113, St. Vincent Street, Glasgow, cashier. R. D. Dunlop, 113, St. Vincent Street, Glasgow, law clerk. Solicitors: Maxwell Hodgson and Co., 113, St. Vincent Street, Glasgow.

THE LEICESTERSHIRE AERO CLUB LTD. was registered on Oct. 1, as a company limited by guarantee, without share capital, with not more than 650 members, each liable for 5s. in the event of winding up. The objects are to acquire the assets and liabilities of the unincorporated association known as "The Leicestershire Aero Club," and to promote and encourage aviation in any form, etc. The management is vested in a Committee, the first members of which are: W. Lindsay Everard, M.P., Ratcliffe Hall, Leicestershire. E. T. Walker, Ratcliffe Road, Leicester. T. T. Sawday, Meadowcourt Road, Leicester. W. H. Hubbard, Guilford Road, Leicester. R. C. Winn, Knighton Drive, Leicester. B. Franklin, 73, Sparkenhoe Street, Leicester. H. Purt, Knighton Road, Leicester. E. S. Harding, The Fairway, Manor Road, Leicester (permanent life members), and seven others. Secretary: H. Purt. Solicitors: Harding and Barnett, 14, New Street, Leicester. The registered office is at 3, Granby Street, Leicester.

## PERSONAL NOTICES.

### DEATHS.

DAHLBECK.—On Oct. 11, at Gothenburg, Sweden, Capt. C. O. Dahlbeck, Royal Swedish Navy (retired), Managing Director of The Skefko Ball Bearing Co. Ltd., Luton, after a short illness.

[Carl Olaf Dahlbeck was a Swedish Naval Officer when he qualified for his Royal Aero Club Certificate, No. 120 (Aug. 29, 1911), on a Farman biplane at the Grahame White School at Hendon. He returned to Sweden and did some flying there before settling down to business. For some unaccountable reason, when he returned to England some years ago in the highly important office of Managing Director of Skefko, none of his old flying associates at Hendon recognised that he was the same Carl Dahlbeck whom they knew and liked so well in the dawn of aviation. And now they will regret their oversight the more deeply.

Captain Dahlbeck was only about 43 or 44 years of age, and his early death will be a great loss to his firm, which of late years has shown astonishing progress and enterprise under his able guidance.—C. G. G.]

KNIGHT.—On Oct. 7, at Abukir Bay, as the result of a flying accident, Cpl. Leslie Arthur Knight, No. 448 (F.S.R.) Flight, R.A.F., H.M.S. *Eagle*.

MINNS.—On Oct. 9, at Martlesham, as the result of a flying accident. AC.1. William Henry Dack Minns, R.A.F.

### MARRIAGES.

BRUCE—MARTIN-ROW.—On Oct. 8, at Odiham, Flt. Lt. Talbot Baines Bruce, M.C., R.A.F., youngest son of the late the Hon. Theodore Bruce, M.L.C., of Adelaide, South Australia, and Mrs. Bruce, Oxford, to Betty, younger daughter of Capt. Charles Martin-Row, R.A.M.C., and Mrs. Row, of Fleet, Hants.

FAIRHEAD—CHASE.—On Oct. 5, at Chingford, Frank G. Fairhead, R.A.F., eldest son of the late A. G. Fairhead, of Chingford, to Gertrude Violet, youngest daughter of Mr. and Mrs. James Chase, of Chingford.

FORSTER—FAIRY.—On Oct. 7, at Cliftonville, Flg. Off. Harold James Forster, R.A.F., son of Mrs. and James Forster, J.P., of Ravensworth, Sutton, Surrey, to Miss Alice Mabel Fairy, daughter of Mr. and Mrs. Fairy.

GARDNER—BALCHIN.—On Sept. 23, at St. Pancras Church, London, Sq. Ldr. Richard Gregory Gardner, R.A.F., to Jessie Grace, eldest daughter of Mr. and Mrs. George J. Balchin, of Regent's Park, London.

HANSON—OWEN-ELLIS.—On Oct. 4, Michael J. V. Hanson, elder son of the Rev. R. E. V. and Mrs. Hanson, of Holmesdale Road, Sevenoaks, to Winifred Lorna, eldest daughter of the late Mr. W. L. Owen-Ellis and Mrs. Ellis, of Four Pines Cottage, Sundridge.

### FORTHCOMING MARRIAGE.

PHILLIPS—HALL.—A marriage has been arranged between George W. Phillips, R.A.F., second son of the late Cdr. W. B. Phillips, B.C.A., and Mrs. Phillips, 32, Cholmley Gardens, Hampstead, and Betty, eldest daughter of Mr. and Mrs. Morris Hall, 7, Burghley Road, Wimbledon.

### BIRTHS.

LYWOOD.—On Oct. 5, to Hilda (*née* Foster), wife of Sq. Ldr. O. G. Lywood, Motor Yacht *Jess*, Hartington Road, Chiswick—a daughter.

PIRIE.—On Oct. 9, at Andover, to Dora, wife of Sq. Ldr. G. C. Pirie, M.C., D.F.C., R.A.F.—a son.


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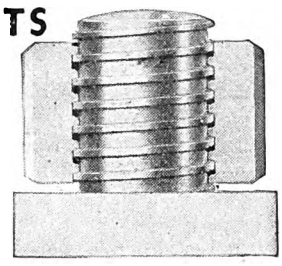
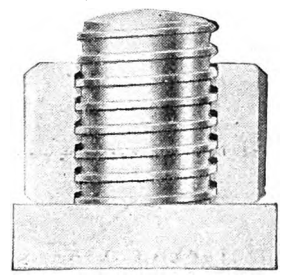


NUT LOOSE



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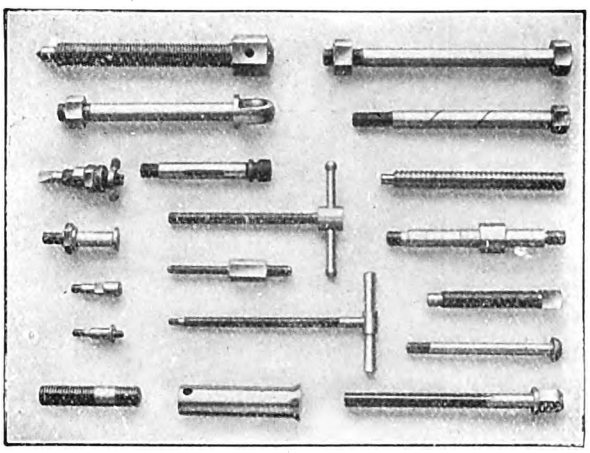

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C.F.H.




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# MISCELLANEOUS ADVERTISEMENTS.

All advertisements for this column should arrive at this office by first post Monday, to ensure insertion.

For the convenience of Advertisers replies can be received at the office of THE AEROPLANE, Cannon House, Pilgrim Street, London, E.C.4.

Special PREPAID Rate—18 words 4/6, 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-, 2d. per word after. Situations Wanted ONLY—18 words 1/-. Box No. 6d. extra.

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**The Aircraft Operating Co. Ltd.**, 8, New Square, Lincoln's Inn, London (Holborn 8131), and Broken Hill, Northern Rhodesia; Rio de Janeiro, South America; Contractors to the Ordnance Survey, Drawing Offices and Laboratories. Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

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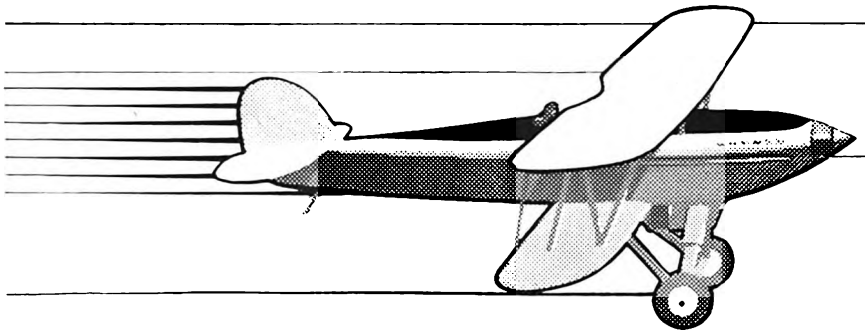

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## ON WEATHER AND OTHER SERVICE.

There is a story to the effect that a gentleman, observing that the barometer in his hall insisted on pointing to "Set Fair" although the day had been consistently wet, took the instrument from its hook on the wall and flung it out of the front door; saying, "Go and see for yourself, you fool!"

Something of that mental attitude seems to affect certain of my young friends who have the time and the money to disport themselves around this country and others in their private aeroplanes. They complain bitterly that meteorological information which is given to them at various aerodromes, and even from the Air Ministry itself, is no more reliable than that given by the barometer in the story.

Personally I have had the greatest respect for our Meteorological Department at the Air Ministry ever since that gliding meeting at Itford Hill some eight years ago, when our friend from the Air Ministry who was nick-named the "Gust-guesser" used to give us astonishingly accurate forecasts of the weather, and equally astonishingly interesting explanations of why the wind and weather behaved as it did, at that period when we in this country first learned something about the art of soaring as distinct from gliding. But I must admit that during the last few weeks the Meteorological Department seems to have been somewhat defeated by the vagaries of the weather.

About the first thing at which many thousands of people look when they come down to breakfast in the morning is the Weather Map in *The Times*. It is equally interesting to agriculturists and to sportsmen and to business men whose duties may call them out during the day into the country. It is particularly interesting to aviators, although aviators, more than most people, have acquired the habit of ringing up the Air Ministry to ask for a forecast of the weather before setting out on anything like a long journey.

The weather map in *The Times* is in fact, only the map of the weather at 18.00 hours the day before. But changes in the general character of the weather are not very quick and so the weather map of six o'clock one evening gives one quite a fair idea of why the weather is what it is at nine o'clock the next morning. And the forecasts which accompany that map have been on the whole amazingly accurate. But, as has been said, during the last few weeks they have been distinctly unfortunate.

Weather which has been forecast as "unsettled" has given us bright sunny days. Weather which has been forecast as "fair" has turned out to be wet and stormy. And naturally my young friends the aviators are upset. Therefore, I suggest in all humility that the Meteorological Department might do good for its own reputation if it were to issue a review of the weather of the past two months with some sort of an explanation of how the Department happened to be defeated.

A possible explanation seems to be that the people at the Air Ministry have been let down by observations sent to them from the Continent, for the aviators who have complained about the inaccurate forecasts have complained still more bitterly about the hopeless inaccuracy of most of the weather information which they get on the Continent, and particularly in France.

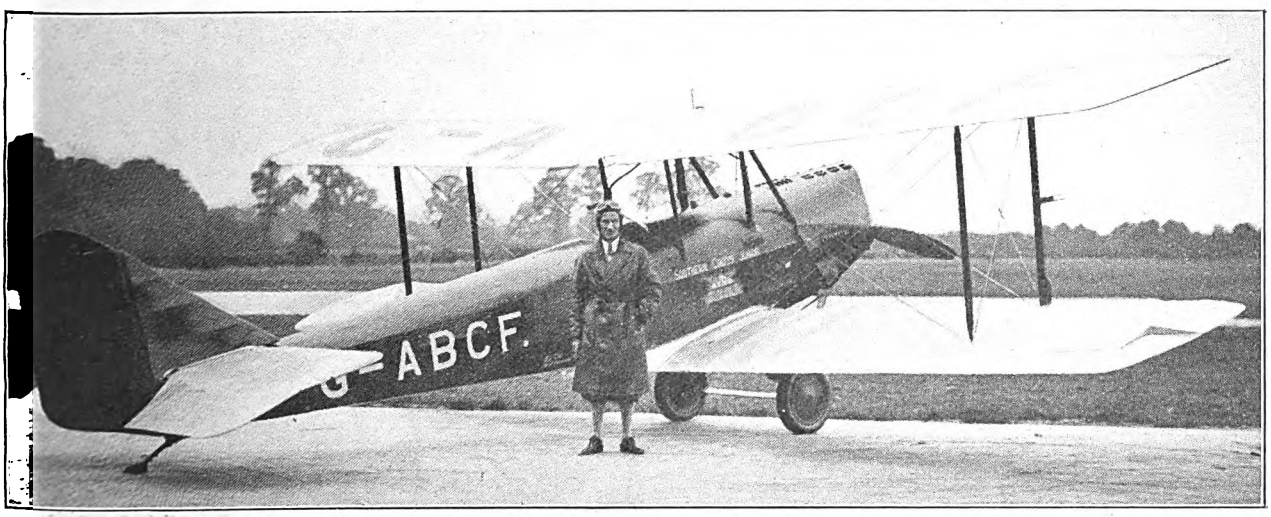
### An Experience.

One pilot complained that when about to fly from Holland to England he asked the meteorological people at one of the aerodromes in the Netherlands to try to get for him a report of the existing state of the weather from St. Inglevert,—the Channel coast station on the hill between Calais and Boulogne. Everybody who has flown in Holland knows how anxious our friends there are to do their best for tourists by air, and also know the love of the Netherlander for strict accuracy. Consequently, when the report came through that the weather was clear enough, the pilot started cheerfully, only to find that when he had got as far as Ostende the clouds were so low that he did not dare to fly over the town to the aerodrome, but had to fly round it almost down on sea level. And when he got there he learned that there was a thick sea-fog all the way down the coast to Calais.

That being so, the message which came through from St. Inglevert to Holland must obviously have been inaccurate. Further investigation suggested that the report which had been telephoned to Holland must have been read from the

"ENVY ITSELF IS DUMB, IN WONDER LOST
"AND FACTIONS STRIVE WHICH SHALL APPLAUD HIM MOST.

(Addison—*The Campaign.*)




**THE RECORD BREAKER.—Wing Commander C. H. Kingsford Smith, R.A.A.F., standing alongside his Avro Avian Sports "Southern Cross Junior" (D.H. Gipsy II engine) before starting on his meteoric dash to Australia, where he arrived only 10 days later, after putting up an average of nearly 1,000 miles a day.**

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ordinary official report of the weather issued early that morning, when the clouds were still reasonably high. Apparently the people at St. Inglevert, unlike the barometer in the story, had never even taken the trouble to go out of the door to see what the weather was really like.

### The Need for Accuracy.

On the whole our own aerodromes are better served than that. But from time to time stories do get about which suggest that local weather reports have been telephoned to distant aerodromes without anybody taking the trouble to look out of the window to see what the height of cloud really is. And there is no doubt that all the way round, especially on the Continent, a good deal more might be done to assure accuracy in such reports.

Such accuracy is, if anything, more important to regular air line pilots than it is to amateurs who are flying for their own amusement. Thanks to radio-telephony the regular air line machines are less at the mercy of inaccurate reports at their port of departure than are amateur pilots. But reports which they get while in the air generally come from their actual destination, and even the air line pilots do not always get all the information they would like to have about the weather at intermediate points which they are approaching. There is very little consolation in knowing that the weather at Croydon is clear, if the pilot coming from Amsterdam or Cologne or Paris cannot be told accurately whether the weather is good half-way on his journey, or whether he had better deviate from his straight course to avoid a bad patch.

### The American Method.

That is one of the lines of development which is being given particular attention in the United States. Not so long ago the American authorities on the operation of air lines announced with much pride that they had developed a system of radio-beacons which would give a straight radio beam along which an air line pilot could fly, with the aid of suitable instruments which would indicate to him whether he was straight on his course or deviating slightly to one side or the other. This seemed a very nice arrangement at first, but the pilots found that while the radio-beam took them on a straight course it also took them through everything in the way of thunderstorms or patches of fog or low clouds which happened to be on the straight path. And often they learned that if they had had proper information, they could easily have dodged the storms or fog-patches by going a few miles off their course.

Therefore, arrangements have been made, or at any rate are being made or are under consideration, on certain routes. for the establishment of observation posts at stated intervals on either side of the route along which the air line machines have to travel. The idea is that observers at these points shall report the state and direction of their local weather at frequent intervals by ordinary telephone to the central control-station, which will be in touch by radio-telephony with the pilots of the machines flying along that route.

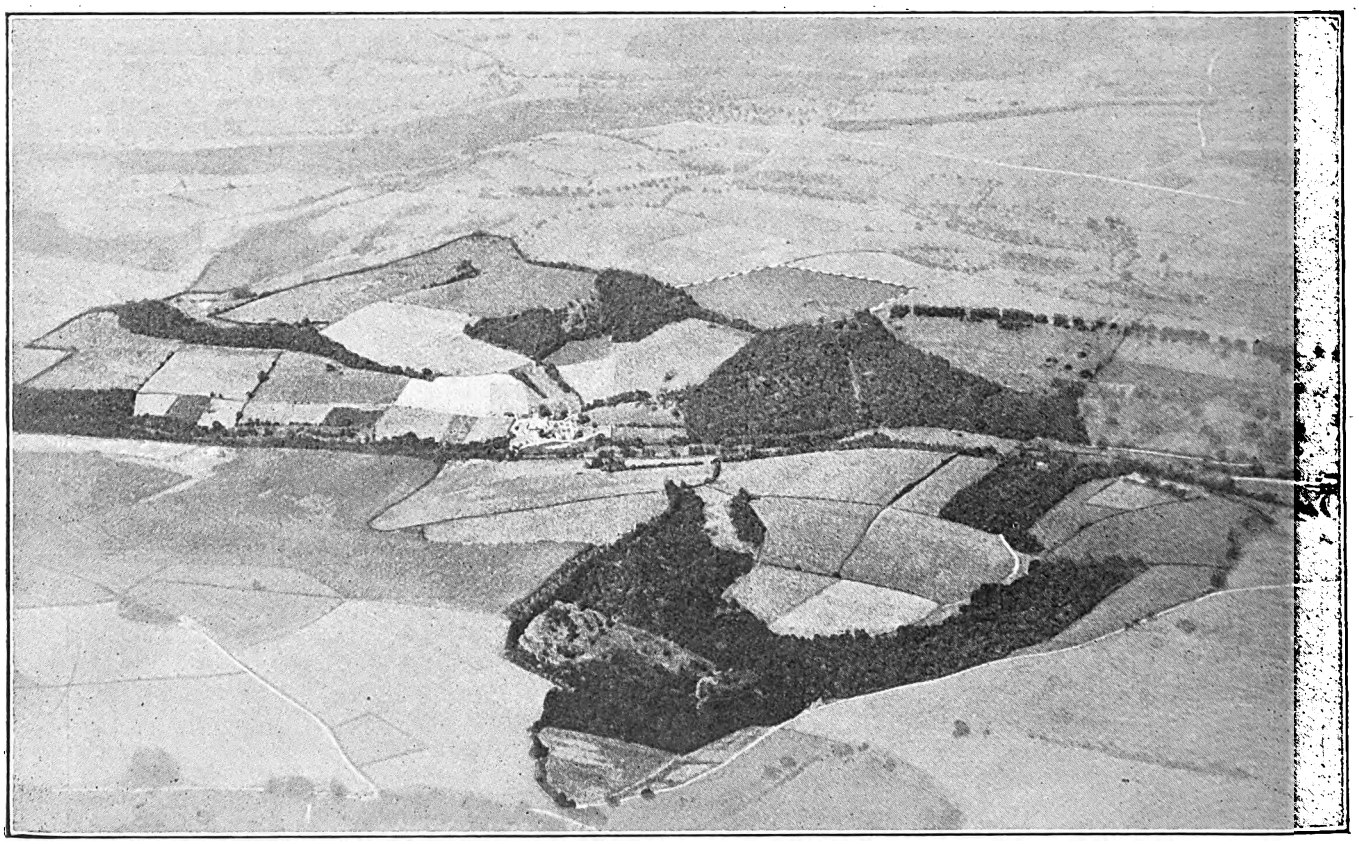
Then the radio control-station will be able to tell the pilot of any machine along the route that at a certain point he is likely to run into a thunderstorm which he may dodge by turning off to the right or left. And as these stations will connect with others so as to make the necessary triangle for a radio-direction signal system, the people in the control-station will be able to check the progress of each machine along the route,—just exactly as a train despatcher on a well-organised railroad can tell the precise spot at which any given train on the system may be at any particular moment.

Thus, with a proper system of direction each pilot can be told when he is running into bad weather in plenty of time for him to avoid it.

### Future and Present.

Naturally no such elaborate system of information by radio can be expected by private owners flying haphazard all over the World. But the time may come, after the main air routes of the world have been properly organised, when privately-owned aeroplanes with suitable radio equipment may be able to follow those main traffic-lines, and may be allowed the use of the information which is being sent by radio to the regular air-liners on that route.

Naturally such a perfect system cannot be expected to come into regular use for a good many years to come. Therefore there is all the more reason why amateur pilots should be assured of getting absolutely accurate information about the state of the weather in whichever direction they may be flying, and should be assured of the most accurate forecast of the weather which can be got in our present very defective knowledge of the Science of Meteorology.



**FINDING A LANDING GROUND.—The photograph which appears above was taken with a Williamson Pistol Camera by Mr. Nigel Norman of Airwork Ltd. and has been enlarged up from a negative 3¼ inch by 2¼ inch. The picture was taken to include as much as possible of a country estate so as to help in locating a suitable landing ground. Actually the ground chosen is that indicated by the dotted white lines a little to the right of the middle of the picture. Some of the top of the photograph has been cut off so that actually as it appears above it is longer and narrower than the original. It shows what can be done by a capable amateur photographer with a Pistol Camera and the help of a little shading by Aerofilms Ltd.**

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### A Lesson.

There is even a possibility that a more accurate system of weather reports might have saved our R.101. We know that only a few minutes before she hit the hill she had been in touch with Le Bourgêt aerodrome, and had then been told that her position was about one kilometre north of the City of Beauvais. Now, that direction-finding apparatus could give her captain precise enough information about the ship's whereabouts on the map, but it could not give what was actually very much more important, that is the ship's height above the ground.

An informative and apparently authoritative article published one day last week stated quite definitely, on the authority of Doctor Eckener, that the *Graf Zeppelin* landed at Friedrichshafen on that same Sunday morning after a night voyage. When the ship actually touched ground her altimeters showed that she was still at a height of four hundred feet. That means that while the ship was in the air the general barometric pressure changed to such an extent that the pressure on the ground was only such as it had been at four hundred feet when the ship started on her voyage.

Now, quite possibly the same comparative change in pressure happened earlier that same morning in Western France before the depression reached Friedrichshafen. This would mean that though the officer in command of the R.101 might judge from his instruments that he was flying safely at a height of 1,000 feet, he was actually down to somewhere about 600 feet,—a level which would not have been safe for any airship in such weather. A big airship flying at 600 feet over that particular country might quite easily be dropped the remaining few hundreds of feet by a sudden down-gust over the top of a hill, with the strong wind which was blowing at the time.

Moreover, although the country immediately around Beauvais is not very high above sea-level, it begins to rise quite quickly just to the south of the city,—and the fatal Beauvais Ridge, to which reference has been made in recent issues of this paper, is only a few miles further South. As this ridge runs anywhere between 700 feet and 1,000 feet above sea level, naturally an error of 400 feet in actual height would be a very serious matter for a big airship which was being deliberately piloted low down.

Whether any such error in the estimated height caused by a sudden drop in pressure does account for the loss of the R.101, cannot be ascertained. But in any case there cannot be any reasonable excuse for anybody operating a big airship in a gale and at night at such a height that an error of 400 feet, or even 1,000 feet would bring it dangerously near to the ground.

### The Helium Question.

Though this which follows has no direct bearing on Meteorology, nevertheless perhaps I may be permitted here to draw attention to a matter concerning the R.101 which seems worthy of public attention.

Since the disaster a statement has appeared in various papers, especially those which are closely in touch with American affairs, to the effect that the cost of enough helium gas to fill the R.101 would have been somewhere between £20,000 and £30,000. In itself this sounds quite a large sum. But when, you consider that the loss of the ship through being filled with hydrogen instead of helium cost us about £500,000 worth of actual work and material, as well as 48 human lives, one begins to wonder whether that £20,000 or £30,000 might not have been well spent on helium, simply as a fire-insurance premium.

The actual cash value of a human life is difficult to estimate. At times, when numbers of important ships waste thousands of pounds' worth of man-hours of their time looking for some idiotic person who has fallen into the sea in an aeroplane which never ought to have been there at all, or go hunting for some fool who is trying to cross the ocean in a small sailing boat, the value of human life seems to be utterly exaggerated. Probably the value of the man-hours expended in saving silly people who at one time or another have descended in the Atlantic when trying to fly across, would total up to a good deal more than the £30,000 estimated to be the value of the helium which would have filled the R.101.

On the other hand, when a big battle is in progress, or when dangers are run to acquire the applause of the public, human life seems to be worth practically nothing at all. But if we assume that the 48 lives which were lost in the R.101 through not having any helium, represented something less than £30,000—because the Government would not spend £30,000 in buying helium—then quite obviously the value of each life lost in R.101 cannot have been very much more than £600 apiece.

This is in fact, a very low value put on the life of any white man. Many a labouring man has received more than that amount in compensation under the Employers' Liability Act, for the loss of a limb or an eye in the course of his duty. And one would imagine that the lives of the officers and men of R.101 would be estimated at a considerably higher figure.

Therefore, let us all hope that if and when His Majesty's Government decide to go ahead with the building of better and bigger airships those responsible for the building will bear in mind that the best possible insurance against the repetition of such a disaster will be the use of helium, even though it may cost more than the Government reckon the lives of the crew are worth, and that proper weather reports covering an area of adequate width on each side of the course in which the machine is to fly will be forthcoming.

### Improved Service.

Writing of improved service suggests that manufacturers of aeroplanes and engines, and even of accessories, might do much good to themselves and their customers by publishing in The Aeroplane hints and tips which their service personnel discover in the course of their work. No mechanism is absolutely perfect, still less is it fool-proof. And users of any mechanical device discover all sorts of tricks to make it more efficient or more durable.

When the Club movement started some four years ago The Aeroplane devoted pages a week to Club Notes in the hope that secretaries would report experiences in the workshops, and dodges discovered by the mechanical staffs which would be useful alike to other clubs and to owner-pilots. All we got were lists of people who were learning to fly and a few purely local jokes. So the Club Notes were dropped and the space was given to matter of general interest,—with the result that since then this paper has been suffering from a ruinous increase in circulation.

Now, at the risk of increasing the circulation still further, but in the determination to help the progress of British Aviation at all costs, The Aeroplane is prepared to make room for any information which will help British aeroplanes to become more reliable. And here the admission is made frankly that the idea came originally from the De Havilland people, who have done so much pioneering work which has been for the good of the Aircraft Industry as a whole.

Last week the De Havilland Aircraft Co. Ltd. asked us to publish a note which said in effect, though more politely, that the new Gipsy engines are certified by the Air Ministry as airworthy at 2,000 revolutions per minute, and must not be run at the maximum 2,300 r.p.m. for more than a few minutes, but that the D.H. Co. themselves do not recommend pilots to run them constantly at more than 1,800 to 1,900 r.p.m.

That was a very sensible piece of advice. We know that Miss Spooner and Mr. Butler and Mr. Broad flew round Europe with their engines doing pretty nearly the full 2,300 r.p.m. all the way. But the D.H. Co. tell their customers frankly that if they want long life and happiness for their engines, and probably for themselves, they will be wise to ignore the Air Ministry's estimate of 2,000 r.p.m., and should keep down to the moderate 1,800 to 1,900 r.p.m.—at which rate the engines will, like the brook in the poem, run on for ever.

Some people might think such advice to be an admission of weakness. But anybody who knows the engines and their makers will see that it is merely sound advice from the people who are best entitled to give it.

Next week we hope to publish some more good advice from the same firm. And we hope that other firms will follow suit and will let us have information of equal value which we can broadcast to users of British aircraft all over the world, and so enable such users to get better service from their machines. There is nothing of which to be ashamed in following so good a lead. And anything which helps to get better service out of any British aeroplane helps to enhance the reputation of all British aircraft.—C. G. G.

## THE BRITISH EMPIRE LEAGUE.

At a meeting of the British Empire League on Oct. 14, over which the Earl of Stradbroke presided, the following Resolution was moved from the Chair and unanimously adopted:—

That the British Empire League hereby desires to convey an expression of its deepest sympathy with the relatives of all those who perished in the R.101, thus giving their lives in the service of their King and Empire; and to place on record not only its recognition of the great loss sustained by the Nation through the death of so many of its most distinguished servants, including the late Lord Thomson, Secretary of State for Air, and the late Air Vice-Marshal Sir Sefton Brancker, Director of Civil Aviation and a member of the League's Committee, but also its full realisation of the great services they had all rendered to the development of Empire air communication.

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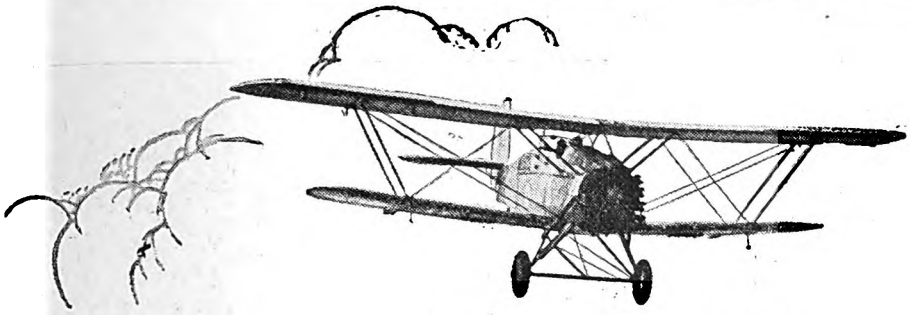

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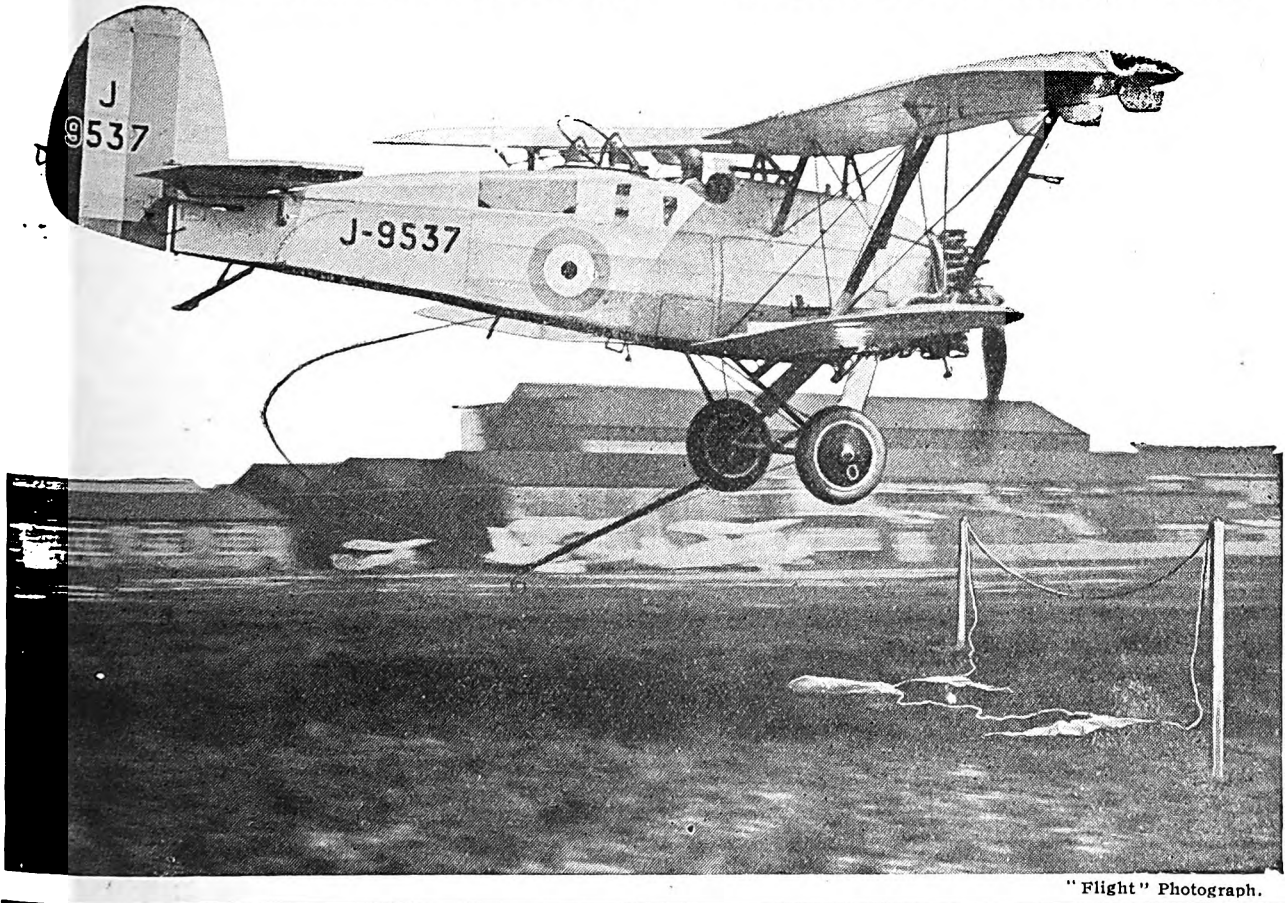


"Flight" Photograph.




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## THE SECRETARY OF STATE FOR AIR.

The following announcement was issued from No. 10, Downing Street, on Oct. 14:—

The King has been graciously pleased to approve that Lord Amulree, G.B.E., K.C., be appointed Secretary of State for Air in succession to the late Right Honourable Lord Thomson, C.B.E., D.S.O.

William Warrender Mackenzie, G.B.E., First Baron Amulree of Strathbraan, was born in 1860 and was educated at Edinburgh University and at University College, London. He was called to the Bar in 1886 (Lincoln's Inn) and "took silk" in 1914.

He has been Chairman of a number of Industrial Commissions and from 1919 to 1926 was President of the Industrial Court. Up to the date of his appointment as Secretary of State for Air he was Chairman of the Royal Commission on Licensing Laws. He is the author of several works on Local Government and Licensing Laws and is one of the Editors of Lord Halsbury's Laws of England.

Lord Amulree, who was raised to the Peerage in July 1929, has had no previous political experience and his aviation experience has been restricted to one or two passenger flights.

He married in 1897 and is a widower with one son and one daughter.

### Our New Air Minister.

Lord Amulree is a complete stranger to everybody in aviation, except perhaps some of the official people,—and so far as is known he has not hitherto shown any active interest in the subject. For that reason he may quite possibly be a better Air Minister than an enthusiastic amateur would have been.

His whole life has been spent in the Law. Therefore he must approach every problem with a trained legal judgment. Added to this he would appear to be the typical hard-headed Scot. But, if one may draw a conclusion from his having chosen his title from the tiny hamlet of Amulree, he is not altogether devoid of sentiment. Moreover as a Mackenzie Lord Amulree is not likely to find himself out of sympathy with the fighting men in the Royal Air Force. Such a combination of qualities may be very salutary to us all at this stage in the development of aviation.

Certain writers have lamented that we should have an Air Minister of such advanced age. But there is much to be said in favour of having an Air Minister of mature years and judgment. Apart from a few exceptional youthful Commanders all the great Generals of History have been men of mature age. The History of the War 1914-18 shows this very clearly. There is no better example than that of Lord Amulree's own clansman, General (now Field Marshal) von Mackensen, whose grandfather was a Mackenzie. At the age of 70 or more he took command of the German and Austrian armies on the South Russian front and swept the Russians out of Poland and Hungary and across Roumania in the most steadily victorious campaign of the War.

When very youthful Commanders have been successful much of their success has been due to aged subordinates whose experience has prevented the disasters which would otherwise have been caused by youthful impetuosity. Napoleon's greatest victories were based on the organising work of old Royalist officers, and Alexander inherited the Staff of his father, Philip of Macedon.

Admitting that a great deal of the present commercial depression in this country is due to the fact that so many big businesses are mismanaged by men whose brains have become fossilised, very often through over-indulgence in a successful middle age, the fact remains that an old man with an active brain is a better chief than a young man. Some time ago Mr. C. R. Fairey, the new President of the Royal Aeronautical Society, delivered himself of the dictum that men's intellects are like aeroplanes, some of them start climbing very fast but soon reach their service ceiling, whereas others start more slowly but go on climbing indefinitely. Judging by his career Lord Amulree is distinctly in this latter and better class, and we may hope much of him until such time as the country elects to have a better Government in general.

Lord Amulree will have in Mr. Frederick Montague an Under-Secretary of State who already knows his job thoroughly and is closely in touch with everybody who matters in British aeronautics. A gossip writer in *The Evening Standard* of Oct. 15 was grossly unjust to Mr. Montague. He said in effect that though Mr. Montague did not indulge in flights of fancy he did not do any other flying either, and generally conveyed the impression that Mr. Montague was unsuitable for his job.

The truth is that Mr. Montague has done a very considerable amount of flying since he took office. In fact more than once people who have had many years of flying experience have ventured to reproach him for travelling by air when the weather was so unsuitable as to make his flight definitely risky.

**OUR NEW AIR MINISTER.—Lord Amulree at the door of No. 10, Downing Street.**

However much one may differ from Mr. Montague's basic political creed there is no getting away from the fact that he is very keenly interested in flying and that he has the ability to understand the mechanical side of aviation in a way which is given to very few politicians. To accuse Mr. Montague of not being airminded is most unjust. And if his successors in future Governments are as good as he is we shall have little cause for complaint.—C. G. G.

## THE AIRSHIPS.

The remains of R.101 are being examined with all possible dispatch by Flt. Lt. R. J. Montgomery-Moore and Mr. Maurice Fitzgerald. The former is the British officer in charge of operations at the scene of the wreck and the latter is a technical officer from Cardington who had much to do with designing the ill-fated airship. The task of clearing away the tangle of debris and sifting the wreckage in the cabin quarters is considerable, but some items of evidence are hoped for that will throw light on what is now mere conjecture.

Meanwhile the work on the R.100 has been stopped, except certain essential repairs and overhaul of the engines. Nothing further will be done about adding the rumoured extra bay or working on the gas-bags, which are now deflated.

The Air Ministry have stated that they wish to avoid new commitments until the enquiry into the disaster has taken place and conclusions drawn which can give guidance on future airship policy. The discharge of personnel who might later have to be re-engaged is being avoided as far as possible.

Survivors from the R.101 flew to Croydon in an Imperial Airways machine on Oct. 15. They are Wireless Operator A. Disley, Engineer A. J. Cook and Engineer V. Savory. They were met by a crowd at the aerodrome, and Service doctors examined them. Cook went to hospital for further treatment and the others were allowed to proceed home.

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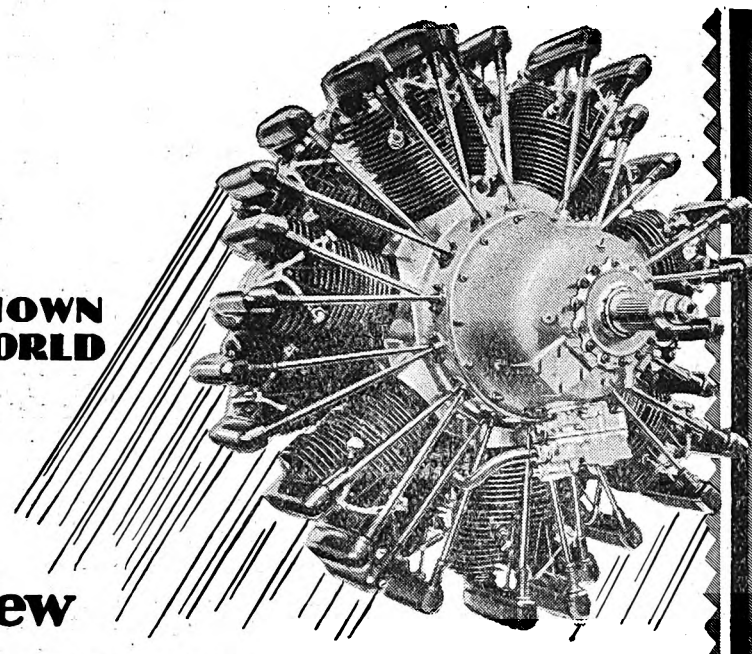

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## THE U.S.S.R. AND WAR.

The following notes on the way in which the Union of Socialist Soviet Republics is preparing for war are reproduced from *The Times*, which has recently published a series of exceptionally well-informed articles on the development of the Russian "Five Years Plan." Readers of THE AEROPLANE who have not read those articles are strongly advised to do so:—

The probable reaction of the capitalist countries to Soviet dumping is too involved a question to be considered here, but concerted action against Russian cheap imports would certainly hinder the execution of the Five-Years Plan. The Soviet policy of obtaining credits at all costs to buy machines and to build factories, with a view to making the country self-supporting, is partly guided by the fear of an ultimate attack by the capitalist countries.

The idea that the anti-Soviet war is as inevitable as the world revolution is typically expressed in the following conversation with a Red Army commander:—"War is bound to come. It is inevitable. The British may not make war against us, but they will certainly get other peoples like the Poles and the Chinese to do it."

### THE WAR INDUSTRY.

At present Soviet foreign policy is emphatically one of peace. There is no desire for war and a fervent wish for time to carry out the Five-Years Plan. Whereas a peaceful Soviet foreign policy can be predicted for the next two, three, or even four years, it is hard to be confident about the years after.

First, one hears on all sides, and the Communists do not conceal it, that the war industry is developing rapidly. The Soviet demand for nickel, which is presumably for the making of bullet envelopes and armour plating, is greater than Britain's.

Secondly, Communism has for the Red Army and for the party the force of a religion, and when one has always been taught that the millennium is close at hand one tends to be impatient at the slowness with which history moves. Nor is the feeling engendered among the young towards the Imperialists likely to lead to the increase of friendliness towards Great Britain.

"You wait; the world revolution will come although men like Cook have proved traitors to the working class," exclaimed a Communist in a private talk. "One day the unemployed of Manchester and of London will not think of sport but of revolution, and at the same time the British will have trouble in their Colonies."

The thesis supported by some Communists is that war will come in 1935. By that year, it is claimed, the Five-Years Plan will have led to such prosperity that Soviet Russia will be able not only to supply her own people with goods, but also to export in such quantities as to be a serious rival to Great Britain and America. The leading capitalist countries of the world will therefore unite to attempt to crush the Communist State, for the existence of the two conflicting systems side by side is impossible. Communism will ultimately triumph, for, they maintain, the present period in world history is that of the disorganisation of capitalism.

Moreover, Soviet war propaganda in the form of placards and publications is intense and is having an effect upon the youth of the country. Among the magazines which have a wide circulation are the *Red Army Soldier, Aviation and Chemistry* and *The Aeroplane*. The Osoaviakhim, the Society for Air and Chemical Warfare, has an extensive membership, and its activities range from lectures on poison gas to training in the use of rifles and machine guns for women and girls as well as for men and boys.

The fear entertained by some Communists that a war will lead to an immediate rising against the régime appears unfounded. A bitter opponent of Communism stated:—"I hate the Bolshevists, but if Russia were at war, whether the Bolshevists were in power or not, I should fight at once, and so would every good Russian." Indeed, war rumours are often but a means of rallying the nationalism of the Russians to the support of the Government and of turning away the attention of the masses from the deficiencies in home policy, for this is the Achilles' heel of the Communist régime.

[The foregoing statements, by a competent observer, who managed to escape being "guided" by Soviet officials, deserve careful consideration.—C. G. G.]

## AN IMPORTANT LECTURE.

A lecture on "Air Transport in Fog" will be given by Mr. F. W. Meredith before the Royal Aeronautical Society on Oct. 23. The Lecture Hall of the Royal Society of Arts will be used and the time will be 18.30 hours.

The interest and importance of Mr. Meredith's lecture may be judged from a single quotation:

> In conclusion, I would say that air transport in fog is immediately practicable, but that it involves an element of risk which will continue until all equipment required has been proved by many years of actual use.

## SOME WORDS OF WISDOM.

On Oct. 16 Mr. J. D. Siddeley gave a lunch at the Royal Palace Hotel, Kensington, to the motor agents for Armstrong Siddeley cars, who had come up to Town for the Motor Show. Strictly speaking the lunch had nothing to do with Aviation, but certain things were said thereat which deserve to be quoted because they indicate a policy, or bring out certain points, which should be noted by everybody in the Aircraft Industry.

As regular readers of this paper know, Mr. J. D. Siddeley was one of the pioneers of motoring, and even of the cycle trade before motors existed. And within the last fifteen years he has built up what is undoubtedly the biggest group of aircraft firms in this country, and one of the biggest in the World. Mr. Siddeley says that he is sixty-five years of age, though he does not look it, and therefore he is a standing refutation of the idea that a man is too old at forty,—seeing that he had hardly begun to build up his aircraft business till he was over fifty.

In the course of his talk to his motor agents after lunch, Mr. Siddeley remarked "We sell more miles in a motor car than anyone else."

That is a phrase which deserves to be read, marked, learned and inwardly digested by all British aircraft manufacturers. What the buyer of a transport vehicle of any kind wants is mileage, and the man who can sell him the most miles consistent with reasonable performance is going to get the business.

Later on Mr. Siddeley referred to the Armstrong Siddeley cars as being remarkable for their "quiet appearance." That also is a good selling point.

There are certain cheery young sportsmen who like what are commonly called "cads' cars," just for fun, but there is a much more offensive type of vehicle, that is the over-decorated kind of thing which is commonly called a gin-palace, and this is often found among the most expensive cars. In aircraft, as in automobiles, a quiet but rich appearance is the greatest possible recommendation.

Later again, Mr. Siddeley emphasised the fact that his firm's cars are built up to the "best British standards," and added, "If cheapness is wanted that standard cannot be maintained."

That should be one of the basic articles in the creed of the British manufacturer. Nowhere is the best British standard more essential than it is in British aircraft.

Talking about the selling of his cars, Mr. Siddeley suggested that the Armstrong Siddeley agents should go and talk to other agents and "see whether the other fellows do not envy them having the agency." That also is a good line.

Except in foreign countries, where war machines are being bought, there are no agencies for Armstrong Whitworth aircraft, but in this country and all over the British Empire there are agencies for Avro aeroplanes, which are also inside Mr. Siddeley's group of firms, and very soon those people who have been lucky enough to secure the Avro agency will find other fellows envying them the possession of it,—more especially now that Wing-Commander Kingsford Smith has given the Avro such a World-wide advertisement and now that in the Avro Five and the Avro Ten the pioneer Avro firm has a selection of the most saleable transport vehicles in the World.

In conclusion Mr. Siddeley referred to the pessimism which is being preached so persistently by our newspapers. He says that there is no reason for pessimism because this country is thoroughly sound financially. The people are putting away over a million pounds a week in Savings Certificates, and that all comes from what are called the Working Classes and not from people with unearned incomes. Moreover, the building societies of the country have never been so busy or so flourishing as they are at present, and all the money put into them also represents savings. In fact, Mr. Siddeley is thoroughly optimistic.

Mr. Massac Buist, the Editor of *The Autocar*, and Mr. Wilfred Aston, the well-known writer on automobile subjects, in proposing the health of Mr. Siddeley, both quoted incontrovertible evidence of Mr. Siddeley's foresight and long-range judgment, and so we may all take encouragement from his views and his recent bold actions in expanding and reorganising his group of aircraft firms.

Mr. Aston remarked that he did not suppose that there was anybody who had been more consistently right than Mr. Siddeley or who had been more consistently told that he was wrong. THE AEROPLANE agrees, out of its own experience. Such is ever the fate of prophets.—C. G. G.

## A MONUMENT AT ALLONNE.

Another proof, if any were needed, of the sympathy which the French nation has with the British over the R.101 disaster is the latest action of the people of Allonne, which is the little village close to where the accident happened. The municipality of this place has decided to offer to the British Government the piece of ground where the wreckage lay, so that a monument may be erected thereon.

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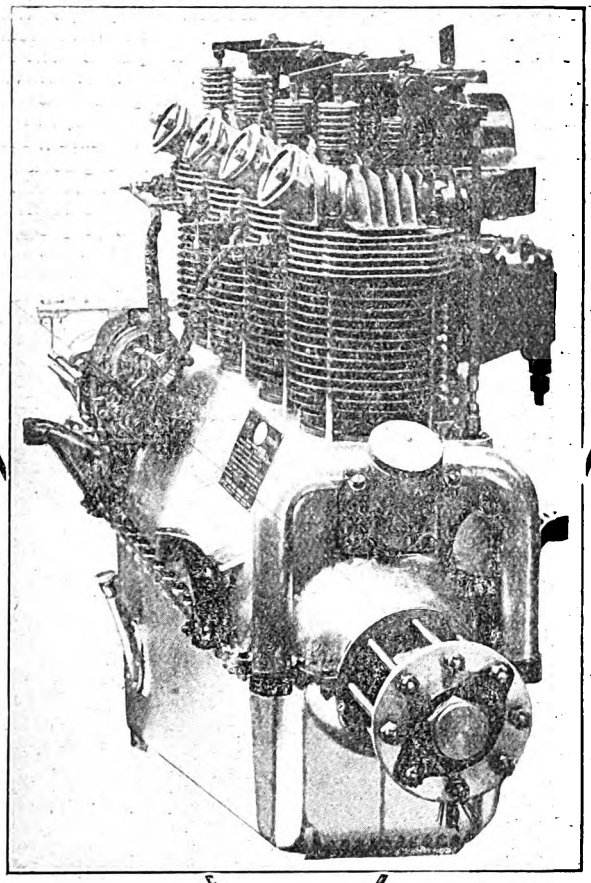
# HERMES II



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## THE GREAT AUSTRALIAN FLIGHTS.

Wing Cdr. Kingsford Smith deserves the heartiest and most sincere congratulations of everybody in the British Empire who is concerned with or interested in aviation. His flight is an outstanding example of what can be done either by one determined man with only moderate organisation or by ordinary routine pilots plus proper organisation.

The time is not so far away when our mails to India and to Australia and to the Cape will be carried regularly at a rate of 2,000 miles a day. Kingsford Smith's splendid performance will then be regarded much as we now regard the 20-mile-an-hour motor car, but to him at any rate belongs the credit of showing how easily with adequate organisation mails can be carried 1,000 miles a day.

Kingsford Smith has been the leading personality of many great flights. He has flown from the United States to Australia, from Australia to New Zealand, from Australia to Europe, from Europe to America, and across America, but this flight on the Sports Avian with the Gipsy engine is certainly his greatest flight. In his other flights he has had companions who have shared the work with him and above all he has had the best of wireless direction all the way. He is a good sportsman and has always given full credit to his wireless operators for the success of his journeys. In this flight for the first time he has proved that he himself is a first-class navigator.

We in this country have additional cause to be pleased with his success for this time he has been flying an all-British aeroplane (with the exception of his American Pioneer instrument board). The Avro was the first of all British aeroplanes and the Gipsy engine is the product of a pioneer, Geoffrey de Havilland, who was practically contemporary with A. V. Roe in the beginning of things, whereas all Kingsford Smith's other great flights were made on a Dutch aeroplane with American engines and equipment.

Certain daily and Sunday papers, with their usual hysteria, hailed Kingsford Smith as the World's greatest airman and they have been practically ordering His Majesty's Government to confer a knighthood on him, cheerfully ignoring the fact that such an honour is the prerogative of the King himself and that the King is not likely to be influenced by newspaper clamour.

Kingsford Smith would be the first to disclaim any pretension to being the World's greatest aviator. In his flight to Australia he has covered what amounts by now to a beaten track so that there is no question of pioneering. All the knighthoods which have been conferred on aviators have been given definitely for pioneer flights which have had direct influence on binding the Empire together. Kingsford Smith does not come into this category at all. But he does deserve the greatest credit for a magnificent performance and whoever may be the World's greatest aviator will be glad to recognise Kingsford Smith as his equal.—C. G. G.

### The Record Flight.

Wing Cdr. Kingsford Smith landed at Port Darwin at 13.55 hours on Oct. 19, and by his flight from England to Australia in 10½ days broke Sq. Ldr. Bert Hinkler's record of 15½ days which has stood for 2½ years. There have been many attempts to beat it since then, the nearest of which was Flt. Lt. C. W. Hill's, and he damaged his Moth badly on an attempted take-off from Atamboea on Oct. 18. He was within one stage of finishing the flight in two days less time than the existing record.

Wing Cdr. Kingsford Smith took off in an Avian (Gipsy II) from Heston on Oct. 9. He had a fuel capacity of 113 gallons and a theoretical range of nearly 2,000 miles if he needed it. His progress from then on was as follows, compared with that of Sq. Ldr. Hinkler who also used an Avian biplane (Cirrus II), and with that of Flt. Lt. Hill:

1st day.—Hinkler, Rome; Hill, Marseilles; Kingsford Smith, Rome—(1,000 miles).

2nd day.—Hinkler, Malta; Hill, Constantinople; Kingsford Smith, Athens—(700 miles).

3rd day.—Hinkler, Benghazi; Hill, Constantinople; Kingsford Smith Aleppo (1,100 miles).

4th day.—Hinkler, Tobruk; Hill, Night in Desert; Kingsford Smith, Bushire—(950 miles).

5th day.—Hinkler, Ramleh; Hill, Aleppo; Kingsford Smith, Karachi—(1,050 miles).

6th day.—Hinkler, Basrah; Hill, Bushire; Kingsford Smith, Allahabad—(950 miles).

7th day.—Hinkler, Jask; Hill, Karachi; Kingsford Smith, Rangoon—(1,100 miles).

8th day.—Hinkler, Karachi; Hill, Allahabad; Kingsford Smith, Singapore—(1,200 miles).

9th day.—Hinkler, Cawnpore; Hill, Rangoon; Kingsford Smith, Sourabaya—(1,000 miles).

10th day.—Hinkler, Calcutta; Hill, Singora; Kingsford Smith, Atamboea—(900 miles).

11th day.—Hinkler, Rangoon; Hill, Singapore; Kingsford Smith, Darwin—(500 miles).

12th day.—Hinkler, Victoria Point; Hill, Sourabaya.

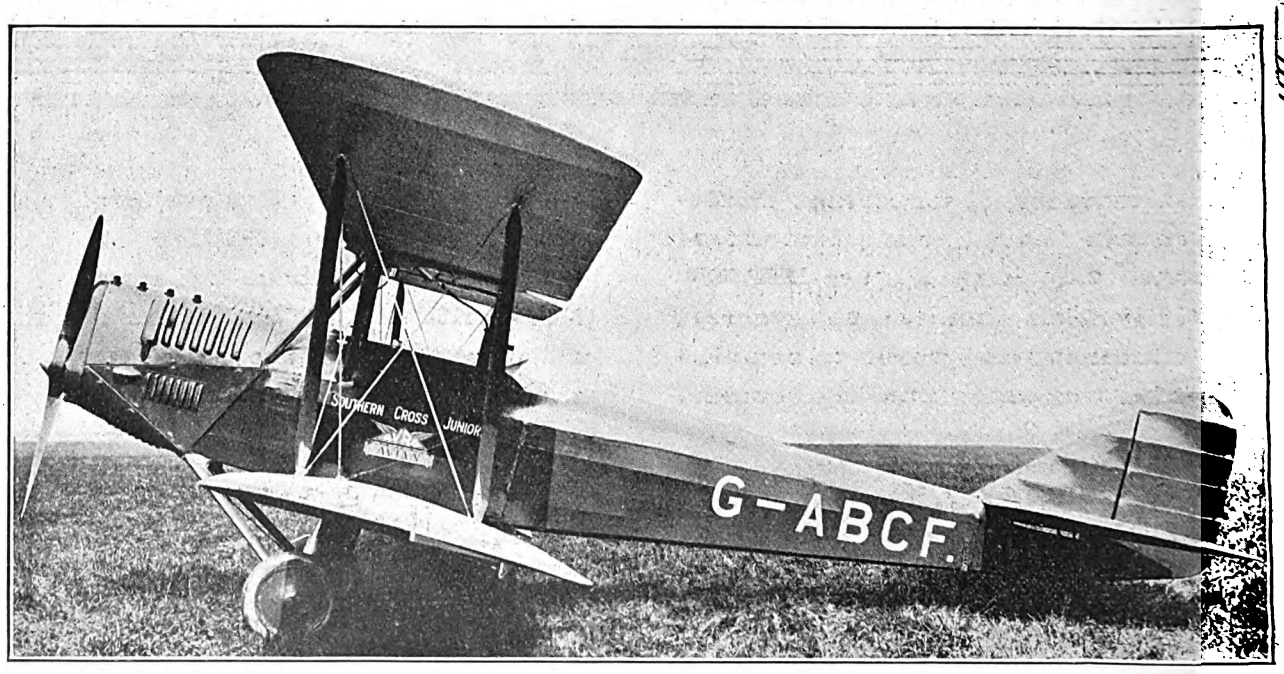
13th day.—Hinkler, Singapore; Hill, Bima.

14th day.—Hinkler, Bandoeng; Hill, Timor (damaged at take-off).

15th day.—Hinkler, Bima.

16th day.—Hinkler, Darwin.

The achievement of averaging nearly 1,000 miles a day on a small machine for 10 consecutive days proves that Wing Cdr. Kingsford Smith is one of the most competent airmen in the World, and the skill with which he had done it adds much more lustre to the name of the defeated record holder than it takes away. The almost invariable ill-success which has attended so many record attempts, and the very real difficulties which these failures reveal, merely emphasise the endurance and address of Sq. Ldr. Hinkler with his much slower aeroplane. He made the last 2,40




**THE RECORD BREAKER.—Wing Cdr. Kingsford Smith's Southern Cross Junior, an Avian Sports with a Gipsy II engine, which has at last broken Sq. Ldr. Bert Hinkler's long-standing record of 15½ days between England and Australia, also made in an Avian. The new mark is 10½ days.**

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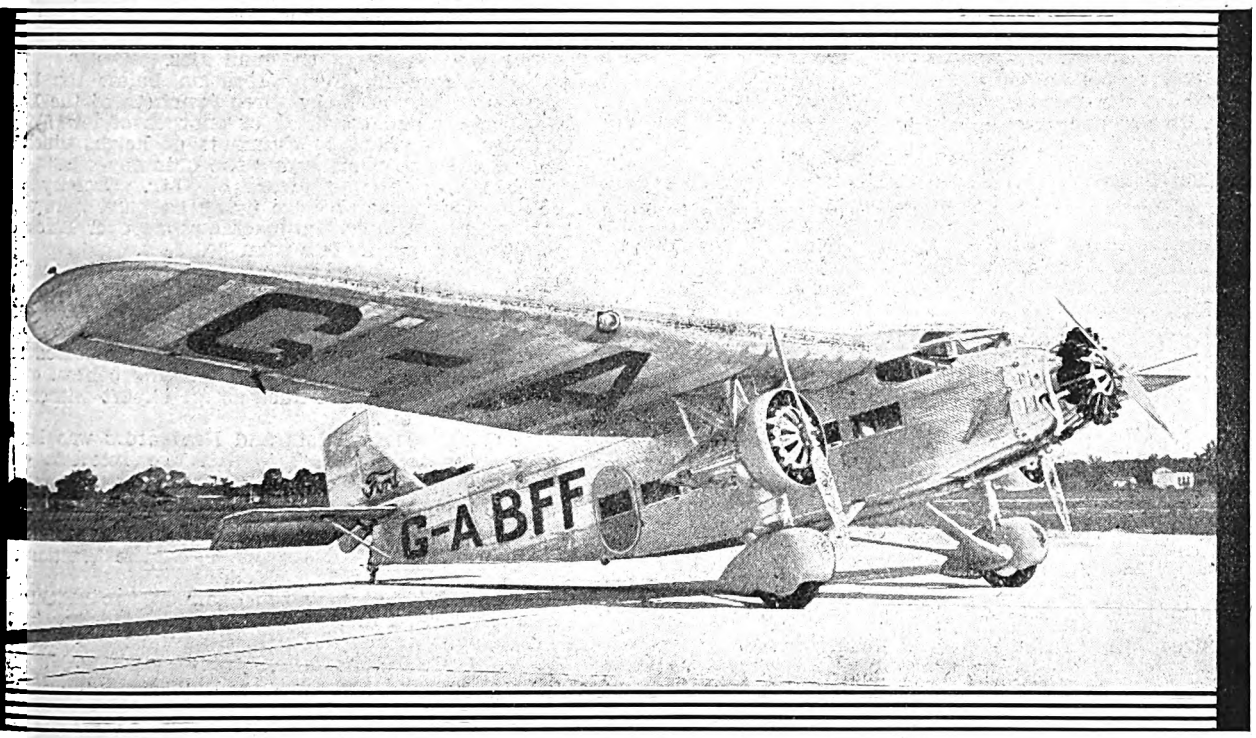
# One Machine . . .
# 1,712 flights . . .
# 98,082 miles . . .
# 17,196 passengers . . .
# not one injury




A Ford three-engined transport Aeroplane has just established an entirely new operation record: 1,712 flights; 133 airports; three countries; 98,082 miles; 17,196 passengers. The Ford Aeroplane's log records 984½ hours in air during this period, with not one injury of any kind.

With their world-wide background of reliability, Ford planes now reach England. Under the auspices of Ford Motor Company Limited, reliability trials will be conducted this Autumn in Great Britain and in four other countries.

Do not miss this opportunity—whatever your interest in air transport may be—of personally inspecting these planes, world-renowned for strength, lightness, speed and safety.

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miles from Singapore in three days, just as Wing Cdr. Kingsford Smith has done.

The weather seems to have been tolerably good throughout, although the Calcutta—Singapore stretch, which seems to get most people into trouble, forced him to do some very low flying for long periods. There were head-winds over certain stages, but the ample range of the Avian-plus-Gipsy overcame the difficulties and obviated any enforced refuelling in the middle of the day.

The meeting of Kingsford Smith and Flt. Lt. Hill on the island of Timor lent a dramatic finish to the end of the race between them. The disappointed pilot calmly suggested to the almost successful one that Kingsford Smith should take his collapsible boat as he had no use for it. The advice and the offer were accepted, as Kingsford Smith admits to serious qualms when flying over long stretches of water with one engine.

He was met at Port Darwin by a large crowd and officially welcomed by Colonel Weddell, the Government Resident. He is continuing his flight at an easy pace to his home.

A telegram was dispatched from Sandringham in which the Governor-General of Australia was asked to convey the congratulations of His Majesty the King to Wing Cdr. Kingsford Smith.

The Prime Minister cabled: "Most hearty congratulations on your wonderful flight."

Lord Amulree, on behalf of the Air Council, cabled: "Warmest congratulations on the completion of your magnificent record flight to Australia."

One of the first messages of felicitation was from Sq. Ldr. Bert Hinkler, who is now in the United States.

### Friends in Deed.

Wing Commander Kingsford-Smith was ably assisted and forwarded on his long way to the Orient by a host of well-tried accessories. These accessories are becoming almost household words and there seems almost no necessity to say that the Avro Avian (Gipsy II engine) was doped with Titanine, and tyred by Palmer. The carburettor was a Claudel Hobson, and B.T.H. magnetos supplied the sparks through Lodge Plugs. Plume petrol and Mobiloil were the fuel and lubricant which carried the flight to its successful conclusion.

## POINTS OF VIEW.

The recent record-breaking flights to Australia and South Africa have been remarkable for the long stages in which they were made and the short time spent at the stopping places. Wing Commander Kingsford Smith and Mr. Caspareuthus have shown an amazing discrepancy to exist between the time taken by light aeroplanes to cover big distances over an organised air route and the time taken by air-liners serving the same towns. So much is this the case that even the untechnical papers are beginning to sit up and draw attention to this fact.

An editorial in *The Week-end Review* says:

The arrival of Mr. R. F. Caspareuthus at Capetown a day ahead of the record is one of the most extraordinary occurrences in recent aviation. Not only did he omit to tell the readers of *The Daily Mail* about it before the start, but he has evidently failed to grasp that the whole object of such an effort is publicity, even after the finish. In stating that he actually came over for his father's birthday he renders comment superfluous.

Simultaneously Wing-Commander Kingsford Smith has added to a magnificent record by reaching Karachi "solo" in five days. Miss Johnson reached it in six, likewise "solo," and the Duchess of Bedford in three days nine hours.

The weekly relay-race of Imperial Airways, on the other hand, takes nearly seven days. A few more flights of this type will begin to make the more captious elements in the business community wonder rather loudly why the discrepancy between the solitary venturer and the organised service is so wide.

Apart from the political and international hindrances which hamper the speeding-up of Imperial Airways, what the ordinary paper does not know are the means by which these solitary pilots kept accurately to their course on these long hops; neither does the ordinary press know other important contributory factors to the consistent time-keeping of these masterly flights.

Wing Commander Kingsford Smith and Mr. Caspareuthus both used Husun Compasses, thereby assuring themselves of the best possible instrumental aid in navigation. Mr. Caspareuthus had Smiths' Aircraft Instruments for his better information and K.L.G. plugs as usual were relied on to make the steady running of the Gipsy III engine possible.

## THE LONDON CHAMBER OF COMMERCE

At a meeting of the Civil Aviation Section of the London Chamber of Commerce held on Oct. 9, Colonel the Master of Sempill was elected to succeed Sir Harry Brittain as Chairman of the Section for the ensuing year. Mr. Alan Butler and Sir Robert McLean were elected Deputy Chairmen.

## THE FIRST WOMAN PILOT IN NEW ZEALAND.

Photographs have been assiduously circulated by various photographic agencies of a woman aviator who has recently arrived in this country and is claimed to be the first woman pilot in New Zealand. These notices have evidently been issued under a misapprehension. The truth is that the first "A" licence issued to a woman in New Zealand was licence number 18 dated Dec. 21, 1925, to Mrs. Gladys Sandford, M.B.E.

Miss Aroha Clifford for whom the claim has been made was in fact the first woman club-trained pilot in New Zealand to qualify for an "A" Certificate, whereas Mrs. Sandford was trained by Air Force personnel and thus has four years' seniority as a woman pilot.

Mrs. Sandford is the widow of Squadron Leader Esk Sandford, A.F.C., who was killed a year or so ago in a motor accident.

## A TEST CASE.

A legal decision of the greatest importance to all pilots and aircraft operators was made at the Preston Quarter Sessions on Oct. 16, when Mr. F. C. Crossley of National Flying Services Ltd., and the pilot-in-charge of Blackpool Aerodrome, appealed against a conviction by the Blackpool magistrates in a prosecution by the local police for dangerous flying. The appeal was allowed, with costs.

The case is important because it establishes the unreliability of estimates of speed and height given by persons inexperienced in judging these quantities.

The evidence for the prosecution before the Blackpool magistrates was given by three members of the Blackpool Constabulary and consisted of charges of low flying over Blackpool, supported by estimates of height which varied from 150 feet to "skimming the chimney-pots." For the defence evidence was given by Mr. Crossley and by two other persons who were flying as passengers with him that at no time when the machine was over Blackpool did the altimeter register less than 800 feet.

The grounds of the appeal were that the magistrates' verdict was against the weight of evidence. Without calling any additional witnesses the Bench stopped the case and allowed the appeal.

Mr. Jackson, K.C., and Mr. Rowson appeared for Mr. Crossley. Mr. J. Jeffs, one of the traffic control officers at Croydon Aerodrome, attended as an expert witness in support of the appeal.

The Guild of Air Pilots and Navigators was legally represented in the court, to watch the interests of pilots generally.

## THE WESTLAND AIRCRAFT SOCIETY.

The fourth annual general meeting of the Westland Aircraft Society was held on Oct. 9, at the Westland works, and some 80 members attended.

Capt. A. S. Keep took the chair in the absence of the President, Mr. R. A. Bruce, who is in America. The president was unanimously re-elected as were the other officers, Mr. V. S. Gaunt, honorary secretary; Mr. J. Johnston, honorary treasurer, and Mr. H. J. Penrose, hon. asst. sec.

The balance sheet was entirely satisfactory and the year under review showed a most excellent selection of lectures and topics. The syllabus for the coming year promises just as valuable a season.

The Westland Aircraft Society, which is the Yeovil Branch of the Royal Aeronautical Society, has become widely known as a result of the excellent lectures which are regularly read before it. A number of these have been reprinted in The Aeroplane.

The Lecture Programme for the new Session opens with a lecture by Col. The Master of Sempill on Gliding and Soaring. After this are a lecture on Model Aeroplanes, a lecture for Ground Engineers, a film display, and a lecture on the Making of Triplex Safety Glass.

A lecture on Aircraft Detail Design will deal with the subject from the viewpoint of the Shops, an important one as the Shops in the end have to produce whatever mere brain has conjectured. There is to be a lecture on Westland Wapitis in India, Mr. C. D. Barnard is to lecture on recent Long-Distance Flights and Mr. Jackson of Short Brothers is to talk about Float and Boat Seaplanes.

This list which only covers the first half of the Session shows the high standard of the programme.

## CANKEROUS COMPARISON.

The following is from a private owner:—

Flew over to Paris last week. I left my Moth in the hangar at Le Bourget on Sunday night. On Wednesday I went along to the *Contrôle* to pay my bill and I was asked how many nights the aircraft had been in the hangar. "Three," I replied, whereupon the official looked very apologetic and said that although only two nights were on the bill he would have to charge me for the extra one. He was sorry but it would be two francs more—exactly fourpence!

I left the machine a night at Croydon in a hangar with open doors and was charged 5s. plus 2s. 6d. landing fee.

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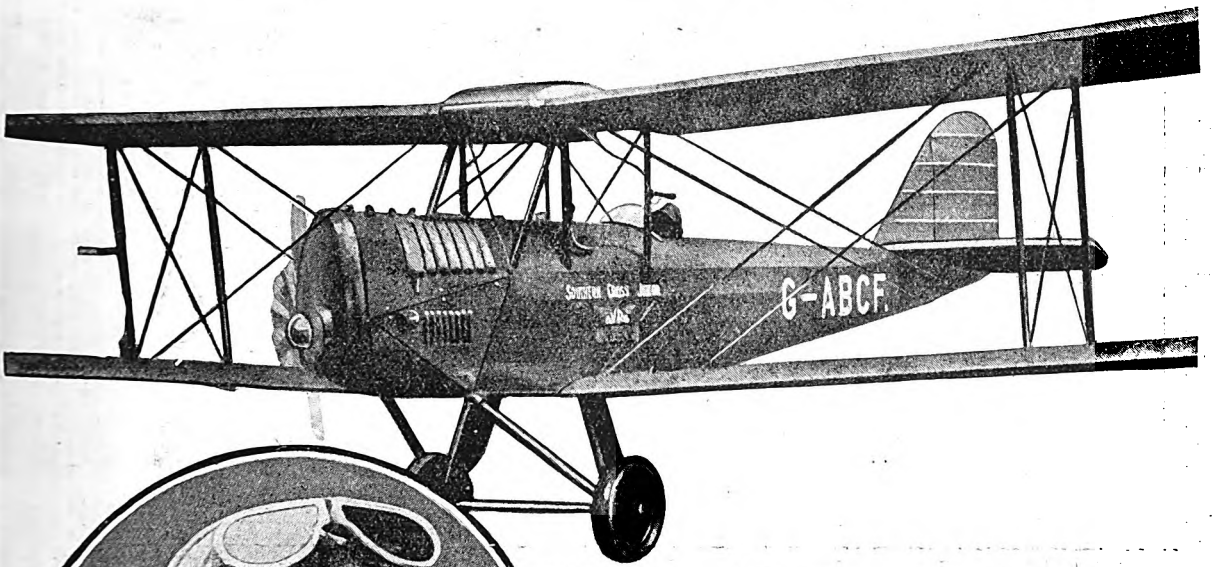
# KINGSFORD-SMITH



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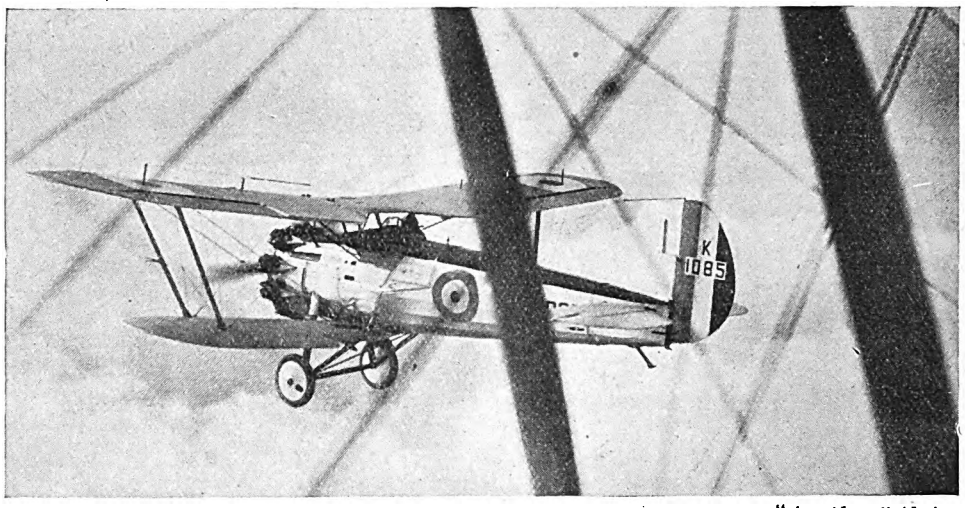
# "Bristol"




"Aeroplane" photo.

The merits of the "Bristol" Bulldog All-Steel Single-Seater Fighter are best appreciated by squadrons of the Royal Air Force, the Royal Australian Air Force and the Air Forces of Latvia, Esthonia and other countries which are equipped with Bulldog machines.

THE BRISTOL AEROPLANE CO., LTD.
*Telegrams: "Aviation, Bristol."* FILTON — BRISTOL. *Telephone: 3906* **Bristol.**

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, October 14.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following are restored to full pay from half-pay:—Air Vice-Marshal E. R. Ludlow-Hewitt, C.B., C.M.G., D.S.O., M.C. (Oct. 2); Wing Cdr. A. R. Arnold, D.S.C., D.F.C. (Oct. 11).

Flt. Lt. G. N. J. Stanley-Turner is placed on the half-pay list, scale B (Oct. 10 to Dec. 9 inclusive).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Plt. Off. L. E. Hunt is transferred from Class A.A. (ii) to Class C. (Oct. 5).

## Appointments.

*Week ending October 20.*

GENERAL DUTIES BRANCH.—Air Vice-Marshal E. R. Ludlow-Hewitt, C.B., C.M.G., D.S.O., M.C., to H.Q., 'Iraq Command, pending taking over command, 2/10.

Wing Commanders A. H. S. Steele-Perkins, O.B.E., to School of Photography, South Farnborough, to command, 7/10. D. Harries, A.F.C., to Air Ministry (D.O.I.), for Air Staff duties, 7/10. C. H. B. Blount, O.B.E., M.C., to No. 70 Sqdn., 'Iraq, pending taking over command, 7/10. R. Graham, D.S.O., D.S.C., D.F.C., to H.Q., 'Iraq Command, for Air Staff duties, 7/10. F. C. V. Laws, to Aircraft Depot, 'Iraq, pending taking over command, 7/10. H. Gordon-Dean, A.F.C., to No. 3 Wing H.Q., India, pending taking over command, 7/10.

Squadron Leaders E. R. Vaisey, to No. 58 Sqdn., Worthy Down, 10/10. A. S. Maskell, to Home Aircraft Depot, Henlow, 10/10. A. C. Collier, to R.A.F. Depot, Uxbridge, 5/9. R. T. Leather, A.F.C., to R.A.F. Depot, Uxbridge, 6/10. J. Noakes, A.F.C., M.M., to R.A.F. Depot, Uxbridge, 6/10. H. A. Smith, M.C., to Home Aircraft Depot, Henlow, 7/10. G. H. Cock, M.C., to No. 2 F.T.S., Digby, 6/10. R. S. Aitken, M.C., A.F.C., to H.Q., A.D.G.B., Uxbridge, 6/10. R. P. M. Whitham, M.C., to Air Ministry (D.O.S.D.), 6/10. A. W. F. Glenny, M.C., D.F.C., to H.M.S. *Hermes*, 3/10. J. C. Slessor, M.C., to School of Army Co-operation, Old Sarum, 1/10. R. Young, to No. 70 Sqdn., 'Iraq, 7/10.

Flight Lieutenants N. Keeble, D.S.C., D.F.C., to No. 1 A.C. Co., 'Iraq, 7/10. F. Wright, to No. 55 Sqdn., 'Iraq, 7/10. H. F. Bradley and C. A. Hoy, M.C., to H.Q., 'Iraq Command, 7/10. B. T. Hood, to Station H.Q., Hinaidi, 7/10. J. H. C. Wake, to Aircraft Depot, 'Iraq, 7/10. C. R. Strudwick, to R.A.F. Depot, Uxbridge, 8/10. S. E. Storrar, to No. 207 Sqdn., Bircham Newton, 6/10. C. E. N. Guest, to H.Q., Coastal Area, 6/10. A. C. Sanderson, D.F.C., to Station H.Q., Kenley, 8/10. J. A. Gray, D.F.C., to R.A.F. Depot, Uxbridge, 19/9. E. J. Protheroe, to Station H.Q., Worthy Down, 4/10. R. L. Ragg, A.F.C., to M.A.E.E., Felixstowe, 10/10. C. F. Le Poer Trench, to No. 60 Sqdn., India, 7/10. H. F. V. Battle, to Aircraft Depot, India, 7/10. G. H. Mills, to Aircraft Depot, India, 7/10.

Flying Officers F. G. C. Stokes, to No. 31 Sqdn., India, 7/10. R. F. Part, to No. 27 Sqdn., India, 7/10. H. P. Fraser, to No. 31 Sqdn., India, 7/10. D. H. V. Craig, to No. 28 Sqdn., India, 7/10. D. B. Knapp, to No. 31 Sqdn., India, 7/10. J. W. C. Glen, to No. 31 Sqdn., India, 7/10. A. C. Watson, to No. 28 Sqdn., India, 7/10. G. N. Roberts, to Aircraft Depot, India, 7/10. C. A. Anderson, to R.A.F. Depot, Uxbridge, 5/9. K. S. Brake, to R.A.F. Depot, Uxbridge, 1/10. V. B. J. Jackson, to C.F.S., Wittering, 22/9. R. S. Collins, to R.A.F. Base, Gosport, 8/10. F. C. G. Freeman, to No. 8 Sqdn., Aden, 26/9. A. N. Luxmoore and E. F. J. L'Estrange, to No. 30 Sqdn., 'Iraq, 7/10. R. J. Cohen and A. Earle, to No. 55 Sqdn., 'Iraq, 7/10. G. D. Emms, to No. 84 Sqdn., 'Iraq, 7/10.

Pilot Officers G. M. Gillan, to H.Q., R.A.F., Halton, 3/10. W. O. J. Coke, to No. 1 F.T.S., Netheravon, 7/10. T. N. McEvoy and R. C. Warner, to Aircraft Depot, 'Iraq, 7/10. T. H. Carr, to No. 84 Sqdn., 'Iraq, 7/10. T. F. Molony, to H.Q., 'Iraq Command, 7/10. D. M. Harrison, to No. 1 A.C. Co., 'Iraq, 7/10. W. H. Jones, to No. 30 Sqdn., 'Iraq, 7/10. R. B. Abraham, to Aircraft Depot, India, 7/10. M. J. Adam, to Aircraft Depot, India, 7/10. D. Barclay, to Aircraft Depot, India, 7/10. N. Kirkham, to Aircraft Depot, India, 7/10. M. E. Pickford, to Aircraft Depot, India, 7/10. J. C. Atkins, to Aircraft Depot, India, 7/10.

MEDICAL BRANCH.—Group Captain H. W. Scott, to H.Q., 'Iraq Command, for duty as Principal Medical Officer, 7/10.

Squadron Leaders E. Barr-Simm, to Central Medical Estab., 13/10. G. H. H. Maxwell, to M.A.E.E., Felixstowe, 21/10. W. G. L. Wambeek, to Princess Mary's R.A.F. Hospital, Halton, 10/10.

Flight Lieutenants J. Hill, to R.A.F. Depot, Uxbridge, 6/10. L. Freeman, to No. 1 School of T.T. (Apprentices), Halton, 4/10. J. L. Groom, to Princess Mary's R.A.F. Hospital, Halton, 4/10. L. I. Hyder, to Station H.Q., Bircham Newton, 18/10.

STORES BRANCH.—Wing Commander W. Millett, O.B.E., to H.Q., 'Iraq Command, for Stores Staff duties, 7/10.

Squadron Leaders E. M. Cashmore, to Aircraft Depot, 'Iraq, 7/10. A. J. Briddon, to H.Q., Coastal Area, 13/10.

Flight Lieutenant E. N. D. Worsley, to H.Q., 'Iraq Command, 7/10.

Flying Officers M. M. McMullan, to No. 55 Sqdn., 'Iraq, 7/10. H. A. Wrigley and J. S. French, to S. and T. Services, 'Iraq, 7/10. G. Blinman, to Aircraft Depot, 'Iraq, 7/10. N. M. Jerram and H. R. Clein, to H.Q., 'Iraq Command, 7/10. C. Thripp, to R.A.F. S. and S. Depot, Aden, 26/9.

ACCOUNTANT BRANCH.—Flight Lieutenant H. E. Cardwell, A.F.C., to H.Q., 'Iraq Command, 7/10.

Flying Officers F. W. Judge, to Station Accounts Office, Hinaidi, 7/10. R. G. Dyer, to R.A.F. M.T. Depot, Shrewsbury, 6/10.

Pilot Officer J. G. Wrigley, to No. 2 F.T.S., Digby, 6/10.

CHAPLAINS' BRANCH.—Chaplain The Rev. G. A. Davies, B.A., to H.Q., 'Iraq Command, 7/10.

## Fatal Accidents.

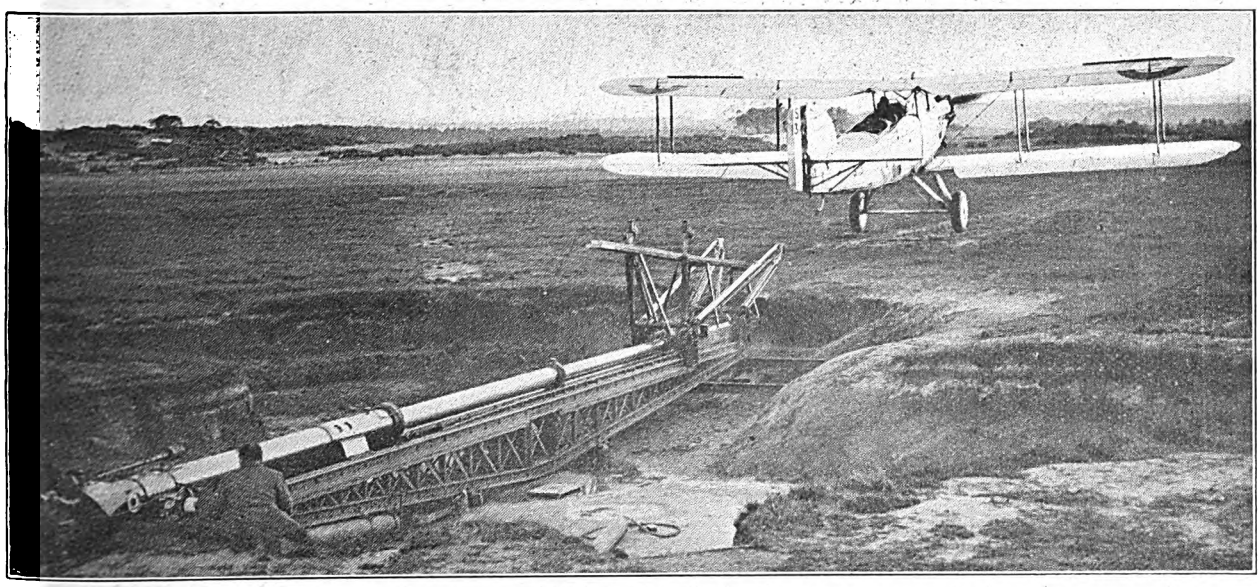
The Air Ministry regrets to announce that as the result of an accident at Halfar, Malta, to a Ripon machine of No. 461 (Fleet Torpedo Bomber) Flight on Oct. 15, Lieut. Maurice Thomas Cowin, R.N., Flg. Off., R.A.F., the pilot of the aircraft, and No. 364505 L.-AC. Edward George Barker were killed.

The Air Ministry regrets to announce that as the result of an accident at Grantham to an Avro machine of No. 3 Flying Training School, Grantham, on Oct. 15, Flt. Lt. James Standley Blomfield, the pilot of the aircraft, and No. 560947 AC.2 Cyril Williamson, were killed.

The Air Ministry regrets to announce that as the result of an accident at Cranwell, Lincolnshire, to an Atlas machine of the R.A.F. College, Cranwell, on Oct. 16, Flt. Cadet Ernest Hamley Fawkes, the pilot and sole occupant of the aircraft, was killed.

## The R.A.F. Staff College.

The name of Flight Lieutenant J. MacG. Fairweather should be added to the list of officers of the R.A.F. who will attend the Ninth Course beginning in January, 1931 at the R.A.F. Staff College, Andover.



**OFF THE MARK.—A Fairey III.F leaving the experimental catapult at Farnborough. A reference to this catapult and a story of certain of its activities appeared in "The Aeroplane" of Sept. 24.**

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announced in respect of Air Vice-Marshal E. R. Ludlow-Hewitt, C.M.G., who is proceeding to 'Iraq to take over the command of His Majesty's Forces in that country.

The Committee authorised the provision of a wreath to be sent to Westminster Hall for the Lying in State of the victims of the R.101. The Secretary was directed to attend, on behalf of the Committee, the Memorial Service at St. Paul's Cathedral.

The Secretary announced that Air Chief Marshal Sir John Salmond had kindly consented to lay a wreath provided by the Fund at the foot of the R.A.F. Memorial on the Victoria Embankment at noon on Sunday, Nov. 9.

The Committee further authorised the provision of a wreath to be laid at the foot of the R.A.F. Bay of the Scottish National War Memorial in Edinburgh on a day to be fixed by the Naval, Military, and Air Force authorities in that Country.

### Specialisation by Short Service Officers.

The following Flying Officers have been accorded permission to sit for the examination to be held next December for selection for specialist courses:—

*Air Defence of Great Britain*:—Barnett, M. I.; Britton, A. F.; Chapman, H. H.; Coverdale, J.; Griffiths, M.; Lock, J. H.; McGregor, H. D.; Morris, R. J. P.; Sales, H. E.; Stevens, A. M.; Tulloch, G. K.; Turner Hughes, C. K.; Wilson, H. P.

*Inland Area*:—Bowling, V. S.; Bufton, S. O.; Crisham, W. J.; Gilson, O. I.; Israel, J. M.; Maclean, D. L.; Smith, P. H.; Weighill, G. R.

*Coastal Area*:—Bateman, W. L.; Elliott, E. D.; Jordan, R. C.; Mountain, R.

*'Iraq Command*:—Hanlon, C. P.; Jones, W. H.; Outhwaite, J. A. S.; Passmore, E. C.

*India*:—Broadhurst, H.; Collings, R. W. P.; Eady, T. W. G.; Ewing, W. G. H.; Farrow, B. G.; Forbes, R. G.; Fresson, N. H.; Kelly, M. R.; Monro Higgs, W. R.

*Middle East*:—Campbell, D. A. L.; Figgins, B. W.; Howes, C. V.; Michie, W. D. J.; Robertson, P. K.; Stephenson, C.

*Mediterranean*:—Cracroft, P. D.; Lester, A. G.; Marshall, K. C. T.; Upton, A. Le R. S.

### A Central Flying School Re-union Dinner.

An informal re-union dinner of past and present members of the Staff of the Central Flying School is proposed. Should adequate support be forthcoming the dinner will be held at "Jules" in Jermyn Street on Nov. 14 at 7.15 for 7.45. The cost of the dinner will be 10s. 6d. per head exclusive of wines and dress will be evening dress with miniatures.

In view of the impossibility of circularising all those officers who have served on the Staff of the C.F.S., members are asked to bring this announcement to the notice of any other past members with whom they may be in touch.

Those intending to be present should advise Flt. Lt. C. Clarkson, 27, Holland Street, Kensington, W.8., before Nov. 11.

### The Wakefield Boxing Competition.

The Lord Wakefield Boxing Competition for teams of novices representing stations will take place at Henlow on Nov. 5 and 6. The competition will be conducted in accordance with the rules published in the R.A.F. Boxing Association handbook.

(i) *Officers' competition "A"—Teams of* 6. *Weights*—Heavy, light-heavy, middle, welter, light, feather. (ii) *Airmen's competitions "B" and "C"—Teams of* 8. Competition "B" is confined to stations with an establishment of 500 and above. *Weights*—Heavy, light-heavy, middle, welter, light, feather, bantam, fly. Competition "C" is confined to stations with an establishment below 500. *Weights*—Similar to Competition "B." Aircraft apprentices over the age of 18 will be allowed to compete.

Incomplete teams may compete in all three competitions, but entries for teams of less than three for competition "A" and less than five for competitions "B" and "C," will not be accepted. Entries, with entrance fee of £2, to include an airmen's and/or an officers' team, must reach the Hon. Secretary, R.A.F. Boxing Association, not later than Oct. 24.

A nominal roll giving names and weights of team, together with entry form for each competitor, must be forwarded to the Hon. Secretary. (Entry form is as shown on page 30 of the handbook.) An additional nominal roll giving the numbers, ranks, names and trades of competitors, seconds and team captains must be forwarded to Sq. Ldr. A. E. Pettingell, Hon. Sec., R.A.F. Boxing Association, Home Aircraft Depot, Henlow Camp, Beds, in order that accommodation may be arranged.

### AN OUTER.

[*The Royal Air Force Quarterly*. Vol. I. No. 4. October Issue. 5s. Gale and Polden.]

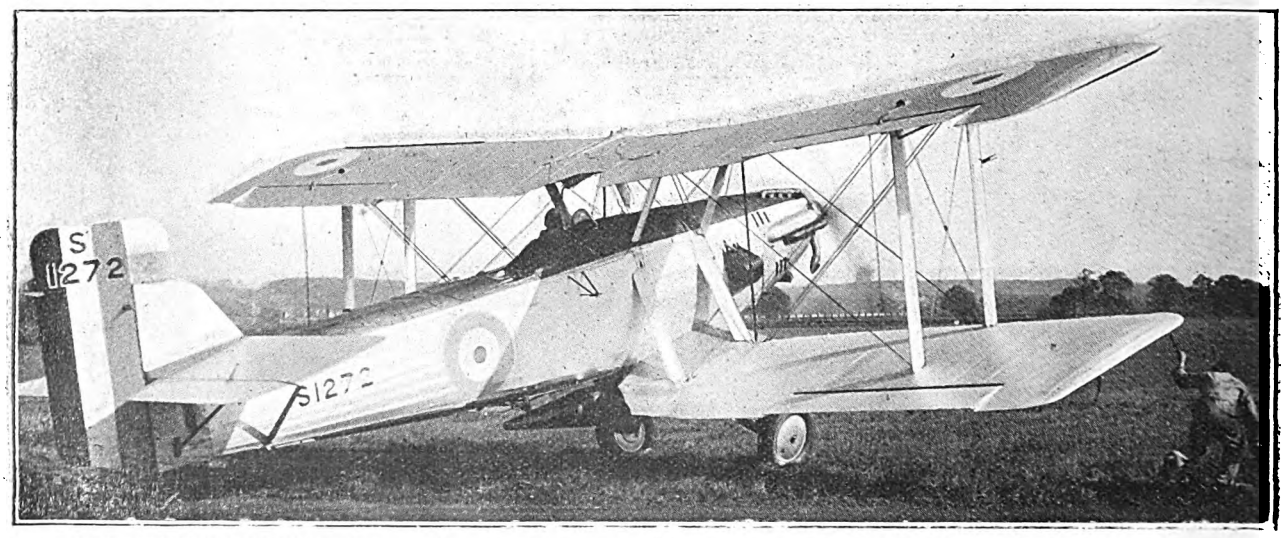
As this journal has now completed the first year of its publication, the reviewer thinks that it is time to take stock of its position, for by now its teething troubles must be over. The reviewer feels there will be general agreement that any semi-official journal issued on behalf of the Royal Air Force should be superior in every way to similar periodicals belonging to the Royal Navy and to the Army. Unfortunately—and the present reviewer knows that he is not alone in his belief—the general consensus of opinion is that the *Royal Air Force Quarterly* is inferior to the *Army Quarterly*, to the *Naval Review* (which is not available to the public, only to naval officers), to the *Cavalry Journal*, to *The Royal Engineers' Journal*, or to the *Journal of the Royal United Services Institution*.

The trouble with the *Quarterly* is that it is not edited in a dignified manner, and that there does not seem to be a clear-cut idea about the policy to be followed concerning the type of article which is to be published within its pages. The reviewer is aware that no two editors can agree in details of policy, but, so far as can be adjudged, what the Royal Air Force needs is a professional journal, and one which will publish articles dealing with the *purely professional side* of the activities of the Force. The French Air Services have their *Revue des Forces Aériennes*, which is an excellent paper, and one which might well serve as a model to the producers of the *Quarterly*.

Those who are responsible for the production of the latter paper seem to forget that there are trade journals and Royal Air Force unit periodicals in existence, and it is the task of these to deal with such matters as civil aviation and sport.

Another weak feature of the *Quarterly* is its illustrations. Many of these are quite unnecessary, the majority have appeared in other aeronautical publications, and, in general, they are poorly displayed, and with their surrounding borders are reminiscent of the average type of commercial catalogue.

Turning now to the issue under immediate attention.—The article by Wing-Commander A. G. R. Garrod on "The personal factor in flying, and the influence of flying on character" is excellent, but all too short. Flt. Lt. S. Wallingford contributes an interesting account of the operations conducted in Western Samoa in 1930, and this is




**FLEET CO-OPERATION.—A rear three-quarter view of the all-metal Blackburn Ripon (Napier Lion engine).**
—("*Aeroplane*" *photograph.*)

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# WING COMMANDER KINGSFORD SMITH FLYING AN AVIAN POWERED WITH A DE HAVILLAND 120 H P GIPSY II ENGINE COMPLETES A RECORD JOURNEY OF 10360 MILES FROM ENGLAND TO AUSTRALIA IN 9 DAYS 22 HRS 57 MINS

SHEER RELIABILITY

The 120 h.p. Gipsy II Engine, which Wing Commander Kingsford Smith used, is manufactured by

THE DE HAVILLAND AIRCRAFT CO., LTD.
Stag Lane Aerodrome, Edgware,
Middlesex.




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illustrated by six photographs, two of which are entirely unnecessary, particularly the one of Fagaloa Bay. Probably the best contribution is that of Captain A. P. C. Hannay, Cameron Highlanders, on "Empire Air Policy," in which he gives a great deal of interesting information about air control. The erudite Dr. J. M. Spaight gives us food for thought in his story of an imaginary International Air Force. Wing-Commander Ronald Graham gives some useful advice to aspirants to the Staff College, and the energetic Captain Liddell Hart gives to us his views concerning the future of armament.

There will be little criticism of any of these articles, for they are, so the present reviewer believes, just the type which should be published, but the same cannot be said for the remainder of the contributions, with the exception of Wing-Commander Laws's article on "Air Photography."

Mr. Woodward Nutt gives us a great deal of information about "The Use of Models in Aeronautics," but is this really needed? Like the good article of Major C. J. Stewart on "Cloud and Fog Flying," it would have been better in a technical journal.

The New Zealand Supplement is, frankly, a "puff," and, although the article "With the Royal Flying Corps" is good in its way, surely enough of such accounts have appeared. Could not the editor of the *Quarterly* have published *some* article dealing with the post-war activities of the Royal Air Force?

The rest of this particular issue is frankly bad—"A Fleet Air Arm Cameo" is only worthy of a station journal—the coloured illustration, "The Sideslip," is quite out of place, and the "Air Notes" are dissatisfyingly meagre. The latter should be one of the strongest parts of the *Quarterly* instead of being the weakest. The reviewer suggests that their compiler should read similar contributions in foreign journals, and he would see how much better they are by comparison.—F.

### OUTRAGEOUS FORTUNE.

[*Solo to Sydney*. By F. C. Chichester. 208 pages, 8½ in. by 5½ in., with ten illustrations. John Hamilton Ltd. From The Aeroplane Book Dept., Cannon House, Pilgrim Street, E.C.4. 8s. post free.]

The ambitious aviator has now no further need to spend time and money in finding out by personal experience what it feels like to fly alone to Australia. He can buy a copy of *Solo to Sydney* and sit down in front of the fire at home and learn all about it. But he had better start early and build up a big fire because he will not be able to leave the book until he gets to the last page.

Mr. Chichester came to England from New Zealand to learn to fly, buy an aeroplane, and fly it back to New Zealand. His funds were limited and the time he had allowed himself for the job was cut down by a serious illness on his way to England. He did not find learning to fly easy, nor were the Gods who look after aviators particularly kind to him. In spite of frequent cables to his long-suffering partner in New Zealand for further funds he was only just able to raise enough money to start on the journey home.

His equipment was inadequate, his experience of aeroplanes was limited and his knowledge of navigation was practically non-existent. But his courage was high and his sense of humour unimpaired. And, as everybody knows, he achieved his object and flew to Australia.

The story of his training, a preliminary flight he made round Europe, the preparations for the flight to Australia and the adventures of the great flight itself make the most joyous book it is possible to imagine. For sheer interest it leaves the experiences of hardened and efficient air travellers stone cold and it leaves the reader alternately aching with laughter and breathless with horror. Mr. Chichester may not be a great pilot but he has written a great book.—C. M. MCA.

### THE MAGNETO MANUAL.

[*The Magneto Manual* (Second Edition) by H. R. Langman. Published by Crosby Lockwood and Son. 246 pp. 5" x 7¼". Numerous illustrations. Obtainable from The Aeroplane Book Dept., Cannon House, Pilgrim Street, E.C.4. 7s. post free.]

This is the second edition of a standard work on the magneto which, considering its complex construction and small size, is surprisingly reliable but nevertheless must be treated with understanding if it is to give good service.

The Magneto Manual is a book for the ordinary user of magnetos whether on aircraft, motor cars, or stationary engines, it does not pretend to supply data for the designer.

A small portion of the work is devoted to an explanation of the how and why of the magneto, touching lightly on the theory in the conventional manner. Exactly how understandable this conventional description of the electric current and magnetic field is to the absolutely non-technical mind is not certain, but it would appear that a simple description of the flow of electrons and dielectric stress would be quite as brief and more simple in these days when everyone has dabbled in wireless, and it is also a more accurate explanation.

Each type of magneto is described at length with illustrations of all the component parts and the variations employed by the different manufacturers. It is unlikely that the average user will have to overhaul any magneto other than those herein described in detail with instructions for making the minor adjustments needed for ordinary running. There are no instructions for performing the more difficult operations such as re-winding or fitting a new condenser. There is just the information necessary for dismantling, cleaning, assembling, and re-adjusting.

Old types are explained, such as the curious and obsolete flywheel—oil-pump—magneto of the model "T" Ford Car, and the ignition system of a rotary aero engine.

The firing order and timing of the leading types of engines from 4 to 16 cylinders is given, also the contact breaker clearances of 17 different types of magnetos.

The paragraphs on timing and advance for various revolutions of the engine make no allowance for turbulence, a factor which varies with different forms of cylinder head, consequently the generalised statements should be compared with the maker's handbook.

On page 69 the spark at the plug is regarded as a single spark passing in one direction from the point to earth or *vice versa*. It is more correct to regard the spark as a damped stream of sparks in both directions dying out rapidly as the condenser discharges.

The method of testing condensers seems rather brutal and if alternating current mains, which are almost the only supply available at the present time, were used the test would probably break the condenser down even if perfect before test.

The examination paper with answers to the questions is useful. The book is a very good manual of all varieties of magnetos and as such cannot be as correct as the maker's instructions for any particular type of magneto. It will show the reader the why and wherefor of the maker's instructions and so enable them to be followed more intelligently. L. Howard Flanders.

### THE ROAD TO ENDOR.

Flt. Lt. Hill's attempt to fly to Australia has created a renewed interest in his adventures as a prisoner-of-war in Turkey. A new edition of *The Road to Endor*, the amazing tale of these adventures by his companion, Mr. E. H. Jones, has been published by John Lane. Copies may be had from The Aeroplane Book Dept., Cannon House, Pilgrim Street, E.C.4, at 3s. 9d. each, post free.


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**FROM ENGLAND TO AUSTRALIA**

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Wing-Com. Kingsford-Smith

**USED B.T.H. MAGNETOS**

his machine being an Avro-Avian light biplane fitted with a De Havilland Gipsy No. 2 engine.

B.T.H.—the magneto used to gain the Schneider Trophy, the World's Air Speed Record and many other notable achievements for Britain.

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# After 2½ years—

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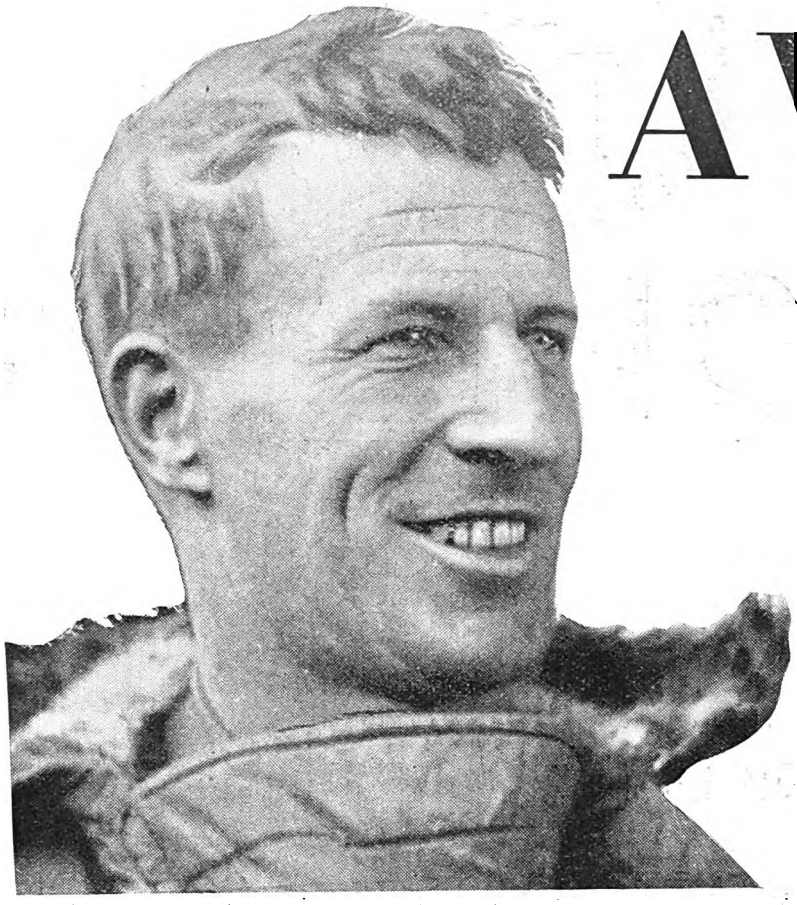

*The Avian Sports similar to that used by Kingsford-Smith costs £825. Other models from £*

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# AVIAN

# still holds record for England to Australia

Wing-Commander Kingsford-Smith, flying an Avian Sports with Gipsy engine from England to Australia in 10 days, has broken the record set up 2 years and 8 months ago by Mr. Bert Hinkler, who flew an Avian with Cirrus engine from England to Australia in 15½ days.

AN AVIAN RECORD BROKEN ONLY BY AN AVIAN

Both Kingsford-Smith and Hinkler *knew* that the Avian can be flown hour after hour, day after day, without undue fatigue, thanks to the sweetness and smooth balance of its controls. Both had seen the sheer quality built into every detail of the Avian, the quality that is worth paying a little more for, and *knew* that here was an aeroplane on which they could rely as on no other.

# Both naturally chose the

# AVIAN

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## ANGLICISING THE FORD.

Mr. Henry Ford is justly and universally famed for his motile tin-ware, so called by friends and foes in affection or ill-concealed envy. The notoriety of his larger pieces is less in Europe than in America, where Ford tri-motor aeroplanes are drawn by a variety of engines over thousands of miles of regular air routes per day. The single specimen which came to Europe last year made a sensation where it appeared, and the two which recently arrived in England bid fair to make an excellent follow-up.

Externally they look much as previous Ford tri-motors have done, with the exception of streamlined spats on the wheels, but the performance gets better constantly and improvements in detail do not cease.

The pieces arrived at Hooton Aerodrome from the Liverpool wharf late last week after 13 days spent as deck cargo without any more covering than the capable Mr. Garriott was able to improvise en route. Mr. Garriott once rode the Western Ranges on the deck of a single-seater cow-pony. After a spell in the U.S. Navy during the late War he gave up leather for Alclad, and exercises on Whirlwinds and Wasps the tact which he learned among the mavericks. His methods are a pleasure to watch.

But even the notoriously hardy American motors do not thrive on spindrift, and instead of being flyable on the third day they were not really limbered up until the fourth, which was Monday, Oct. 20.

For the rest the two all-metal machines looked like new. The assembly was a mere matter of a series of clicks as the wing-butts slipped into their fittings and were bolted up. The ingenious sandwich of aluminium-dural-aluminium which is known as Alclad, of which all exposed parts are made, showed not a spot of corrosion anywhere. The sparking plugs had suffered most, with the result that one of the six engines failed to respond to the first whirl of the inertia starters. The valves also seemed inclined to stick until thoroughly warmed up. Incidentally the lack of shipping technique was a matter or sub-contracts, but is nevertheless surprising because so peculiarly un-American. The testimonial to the machines themselves is all the greater in that they survived not only the corrosive effects of the crossing but also of subsequent comment.

The solemn rite of putting together a large aeroplane is cut almost sacrilegiously short by the Ford staff, but this is largely a result of their system of doing the thinking in a design office, the experimental tinkering in the home workshops and leaving nothing to be done in the field but the insertion and tightening of bolts once and for all.

The first of the pair ready for test was G-ABEF, and therefore appropriately initialled after Mr. Edsel Ford, to whom the Ford interest in Aviation is primarily due. It has three Wright Whirlwinds of 300 h.p. Mr. Le Roy Manning, chief test pilot of the Ford organisation in America, took it up on Oct. 19 and inducted it into the European atmosphere with a few stall turns and sedate gambols. The take-off is remarkable, and occupied 5 seconds when the machine was light. Mr. Manning took with him Mr. H. C. Johnson, recently R.A.F., who will be the European demonstration pilot.

Mr. Manning has been flying Ford aircraft for six years. He brought the first of its kind to Europe last year, but is not quite acclimatised to October on the Mersey. We suspect that the weather indoors is rather a drastic change; in spite of which his personality remains charming and genial.

Meanwhile the larger machine, with three Pratt-and-Whitney Wasps of 420 h.p. each, was rolled out and run up. It will eventually adopt the registration G-ABHF, after Mr. Henry Ford, but at present the lettering is FF, which probably signifies Father Ford.

Mr. Manning was anxious to get the machines down to Heston after the unexpected delay, so he decided to take off with EF while the light was good and "test-hop" FF on his return.

The passenger list climbed in—which is unusually easy with the wide oval door of the Ford and its deep fuselage so low to the ground. A few local agents also came for the first circuit.

The machine handles beautifully on the ground with its wheel brakes and tail-wheel, and it got off with a very short run. For ten minutes Mr. Manning circled over the Mersey, mostly on two engines only, with which he also climbed quite easily. Incidentally the Wasp-equipped model climbs nearly as well on two engines as some commercial planes will on full power.

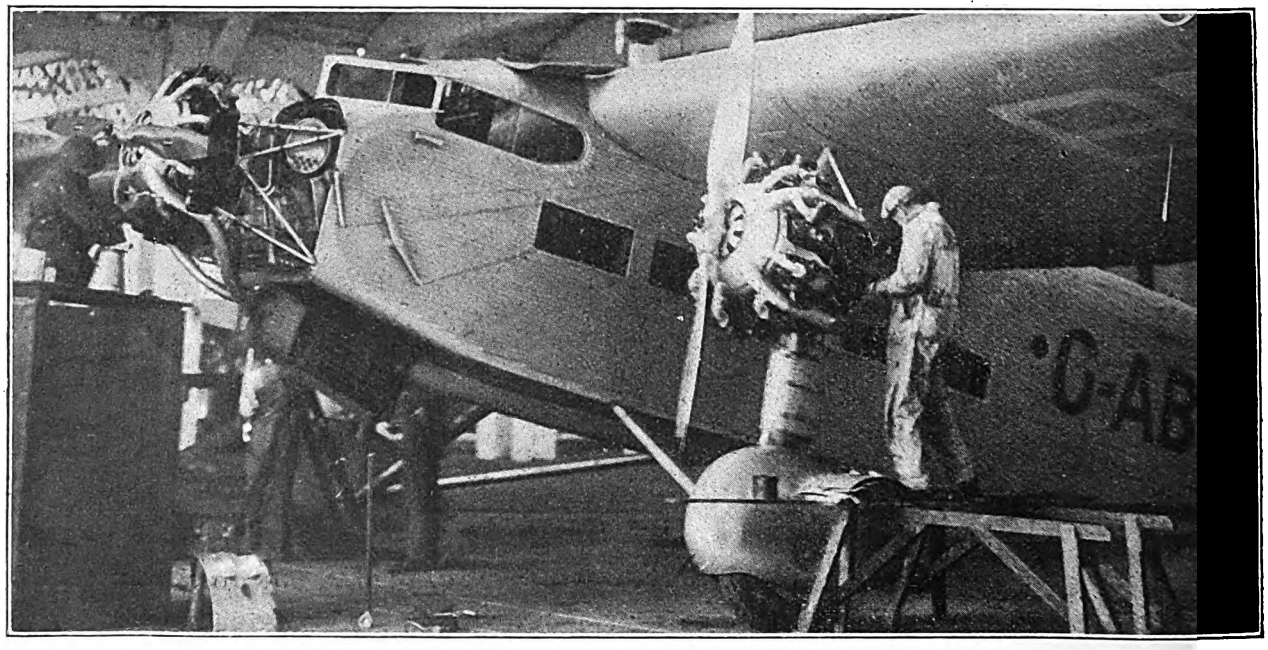
After landing the extras we set out for London in beautiful weather. But after a few minutes' flight the passenger list noticed an ominous oil leak from the port engine and began to chatter and gesticulate.

Nearly all were equipped with that little knowledge which is such a nuisance, and some had more. Anyway, Mr. Higgs, also late R.A.F., manager of the Ford Aviation Department in Europe, went through the little door into the sanctum sanctorum and Mr. Manning spun us round on one wing and back to Hooton.

If nobody had noticed anything everything would have been all right. An over-enthusiastic mechanic had overfilled the oil tank and the scavenge pump was causing it to overflow. We had heard that Whirlwinds were very economical of oil, but never previously saw an engine which manufactured it. Anyway, Mr. Garriott took off the filler cap and let a quart or so run out, and the journey began again.

It developed into a race with the light. As far as Birmingham the weather was perfect, but the usual soupy mass overhung the latter city, and when that had been nosed through we ran into rain and under clouds that were so dense as to bring darkness on very early.

The lights were all winking below as we reached the downs near Tring and the London haze was coming up on a south wind to complicate matters. At Northolt Mr. Manning circled and landed with the aid of his wing-




**FINISHING TOUCHES.—The 4-AT-E Ford tri-motor (three Wright Whirlwinds) being spruced up at Hooton. Mr. Garriott, engineer to the expedition, is seen grooming the port engine.**

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# BRITISH SALMSON
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THE FAMOUS 40/50 SALMSON

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**37** Hours **28** Minutes **57** Seconds

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## THE WORLD ENDURANCE RECORD

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## THE RECORD OF DURATION FOR A SINGLE PILOT IN A LIGHT AEROPLANE

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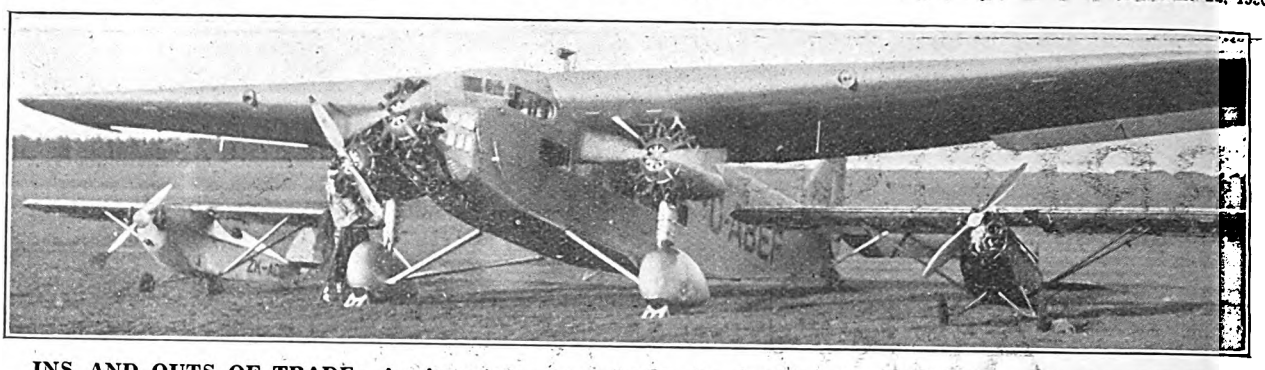

**INS AND OUTS OF TRADE.—An impressive import with its familiar hieroglyphic on the fin, and two Comper Swifts. The one on the left is for export to New Zealand, as is shown by the marking. The other is the Pobjoy-engined version.**

landing-lights. He explained that he was not prepared to fly over unknown country in the dark, and as Mr. Johnson had never previously been to Heston he had advised an emergency visit to Northolt. By telephone we learned that the landing flares were out at Heston, but the pilots had not seen them through the mist.

The Ford tri-motor is quite comfortable inside, especially as the chairs are adjustable to different degrees of inclination. A tall person could do with a little more leg room. The windows open by sliding and in the floor are heaters which throw up a really powerful warmth when open. They are worked by the exhaust pipe of the nose engine which runs down a trunk beneath the cabin floor.

The cabin is unusually lofty in the rear half as it gets the benefit of the domed roof of the fuselage. Forward the roof is level at about six feet from the floor and has trap-doors through to the interior of the wings. In the American models this is used as luggage space, but any bought in Europe will be fitted with a large compartment behind the lavatory and a door in the fuselage on the opposite side from the passengers' entrance.

The finish is neat without being luxurious. Each passenger has an individual window, blind and electric reading lamp. The nine-cylinder engines ran very smoothly and although there is noise enough with the windows open—as everyone seemed to prefer them—the relative absence of vibration makes it less noticeable. Nobody used cotton wool or was at all deaf after the run, even with Mr. Manning cruising at 115 m.p.h. to beat the darkness.

The Wasp model recently set up a World's record for commercial cabin ships in its class by flying at 162 m.p.h.

The specifications of each type are as follows:—(The first figure refers to the 4-AT-E (three Whirlwinds) and the second to the 5-AT-C (three Wasps).)

Weight.—Gross 10,130 lbs., 13,500 lbs. Empty (fully equipped for passenger service) 6,500 lbs., 7,600 lbs.

Load.—Disposable 3,630 lbs., 5,900 lbs. Paying 1,725 lbs., 3,643 lbs.

Speed.—Maximum 132 pm..h., 152.5 m.p.h. Cruising at 1,700 r.p.m. 107 m.p.h., 102 m.p.h. Stalling 57 m.p.h., 64 m.p.h.

Range.—Radius of action with standard fuel capacity 570 m.p.h., 560 m.p.h.

Climb.—At sea level 920 ft.p.m., 1,050 ft.p.m. Climb from sea level in 10 min. 7,200 ft., 8,000 ft.

Ceiling.—Service (three motors) 16,500 ft., 18,500 ft. Absolute (three motors) 18,600 ft., 20,500 ft. Absolute (worst two-engined combination) 7,100 ft., 10,500 ft.

Dimensions.—Span 74 ft., 77 ft. 10 in. Length 49 ft. 10 in., 50 ft. 03 in. Height 11 ft. 9 in., 12 ft. Tread 16 ft. 09 in., 18 ft. 07 in. Cabin, width 4 ft. 6 in., ditto. Height 6 ft., ditto. Length 16 ft. 03 in., 18 ft. 09 in.

Wing Area.—785 sq. ft., 835 sq. ft.

Passengers.—Seats (removable) 11, 13 to 15. Baggage space, 30 cu. ft.

Fuel and Oil.—(Standard) Fuel 231 gallons, 277 to 355 gallons. Oil 24 gallons, 34 gallons.

Power.—Three Wright Whirlwind J6 or Pratt and Whitney Wasp Juniors. Three Wasps. Total power 900 h.p., 1,260 h.p.

The price will be somewhere between £11,000 and £13,000 including all instruments and full equipment,—except wireless, which is to customer's choice and varies in price.

## AN AIRPORT FOR NORTH WALES.

Another step has been taken towards the provision of an Airport for North Wales. The Llandudno Council at a meeting on October 17, empowered their surveyor, Mr. W. T. Ward, to work in conjunction with the surveyors of the Colwyn Bay, Conway Borough, and Conway Rural Councils. These four officials are to make a report upon the most suitable site for an aerodrome to meet the needs of airborne traffic to and from the coast of North Wales.

The general opinion appears to have been that the cost of an Airport would be more than one town could stand, and so this course of co-operation, which seems very wise, has been decided upon. Northern Airlines Ltd. have promised their support. We hope that when the aerodrome is finally built it will be properly Hunterised for the comfort of those who travel to and from it.

## THE U.S. NATIONAL AIR TOUR.

The sixth annual National Air Tour for the Edsel B. Ford Trophy, the most important American commercial aeroplane competition, has been won by Harry L. Russell, a pilot of the Ford Motor Company who learned to fly in a Ford Tri-motor and has never flown anything else. He was flying a Ford Tri-motor 7-AT fitted with one 420 h.p. Pratt and Whitney Wasp and two 300 h.p. Wright Whirlwind engines, and carried an actual load of 5,630 lbs. at an average speed of 131.9 m.p.h. over the 4,800-mile route of the Tour.

The Tour started from the Ford Airport, Detroit, on Sept. 11 and returned to the same place on Sept. 27 after visiting 30 cities in 14 of the United States and three Canadian provinces. The formula used for this contest was as follows:—

$$\frac{\text{Contest Load}}{\text{Rated h.p.}} + \frac{160}{\text{landing time + take-off time + 10}}$$

The resultant figure or constant was used to multiply the speed obtained on each leg or stage of the Tour to get the score for each stage. Actually Russell was seventh so far as average speed was concerned, but he obtained a very high "figure of merit" by means of the above formula.

His contest load was 5,639 lbs. but he was granted an additional 364 lbs. allowed by the rules as his machine was fully equipped according to its specifications.

His total rated horse-power was 1,020 but as his machine could remain at 6,200 ft. for 15 mins. on the least efficient combination of its engines, so, according to the rules, his rated horse-power, as used in the formula, was reduced to the total h.p. used at the time this performance took place, i.e. the rated h.p. of two Wright J—6 engines, which was 600. [This was rather clever, because the least "efficient" combination would be the nose engine (425 h.p.) and one wing engine (300 h.p.), or a rated 720 h.p., whereas the Committee evidently took the lowest combination as being the least "efficient" which is not at all the same.—Ed.]

Eighteen competitors started in the Tour and all completed the course satisfactorily. All flew the 4,800 miles at full throttle and some very high speeds were averaged. Three competitors averaged over 147 m.p.h. and five averaged over 131 m.p.h.

The fastest competitor was Art Davis who flew a Waco biplane (240 h.p. Wright Whirlwind engine). His speed over the Tour was 148.4 m.p.h. and J. H. Livingston flying a sister machine averaged 148.3 m.p.h. These two pilots came third and second respectively in the final classification.

M. E. Zeller flying a Ford Tri-Motor 5-AT (three Pratt and Whitney Wasp engines) averaged 147.9 m.p.h.

About a dozen non-competing machines flew the course with the competitors, some carrying officials of the Tour, some carrying spares or acting as service tenders and some merely flying round.

The most interesting of these non-competitors was a Waco biplane fitted with the 225 h.p. Packard-Diesel engine, which was flown by Walter Lees, the Packard test pilot. This machine covered 4,935 miles in 50½ hours at an average speed of 98.5 m.p.h. 437 gallons of fuel were used at an average of 8.73 gallons per hour. The total cost of the fuel was $37.13 (£7 16s.) or $.0075 (0.37d.) per mile at the ruling cost of such fuel in the United States in 100 gallon quantities.

## ON DEMONSTRATION.

The Westland Wessex six-passenger civil monoplane, with three Genet Major engines, will be at Hanworth Air Park during this week, beginning Oct. 20, until Sunday, 26th. The visits and inspection of interested persons are invited.

The Wessex will be absent from Hanworth just the one day on Oct. 25 when it will take part in a demonstration at Croydon Aerodrome for the Dominion Premiers.

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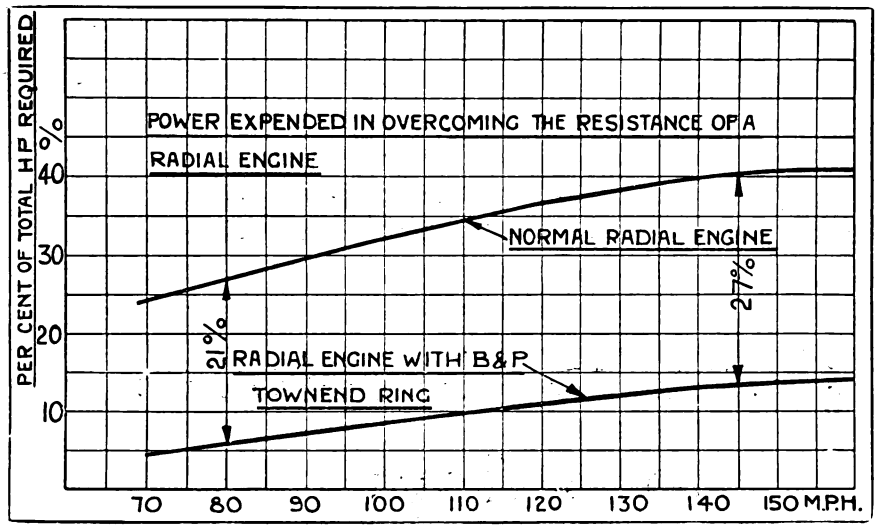
# TO USERS OF AIR-COOLED RADIAL ENGINES

Users of air-cooled radial engines are expending a large proportion of their engines' output in driving the engines themselves through the air.

The upper curve in the figure below shows the power expended, in the case of a machine with a 450 H.P. Radial engine, in overcoming the resistance of the engine at speeds of from 70 to 150 m.p.h. This wasted power is expressed as a percentage of the total H.P. required by the whole aeroplane at the particular speed.




The lower curve shows how the power thus wasted can be reduced by fitting the engine with a Boulton & Paul TOWNEND RING. This saving amounts to from 20% at low speeds to 27% at high speeds.

**25% REDUCTION IN POWER expended at cruising speed means either:**

**(A) 25% REDUCTION IN FUEL CONSUMPTION for the same range and speed.**

**25% REDUCTION in engine output for the same range and speed, with a consequent increase in engine life between overhauls, reduced MAINTENANCE COSTS and increased reliability.**

**AN INCREASE IN PAY LOAD corresponding to the reduced weight of fuel required.**

***OR***

**(B) 10% INCREASE IN CRUISING SPEED for the same engine power.**

**10% REDUCTION IN FLYING TIME for the same service, and hence**

**10% REDUCTION IN FUEL CONSUMPTION.**

**10% REDUCTION IN MAINTENANCE & DEPRECIATION.**

USERS OF RADIAL AIR-COOLED ENGINES INTERESTED IN SECURING ECONOMY IN OPERATION SHOULD APPLY FOR INFORMATION CONCERNING THE TOWNEND RING TO :—

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# WORLD RECORD FLIGHT

# England to Capetown in 8 days

**Mr. R. F. Caspareuthus has flown from England to Capetown in eight days, thus establishing a world record for the flight.**

**He left Lympne in his Puss Moth (Gipsy III engine) on October 5th and reached Capetown on October 13th.**

**Throughout his flight he relied on Shell.**

# SHELL

## AVIATION PETROL AND

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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### THE ACCIDENT AT DETLING.

On Sunday, Oct. 19, Miss Irene Burnside, daughter of Canon W. F. Burnside, headmaster of St. Edmund's School, Canterbury, was killed and Dr. E. D. Whitehead Reid was fatally injured when an aeroplane piloted by the latter crashed in the grounds of East Sutton Park, near Detling, Kent.

Dr. Whitehead Reid was returning to Canterbury after having made a short cross-country flight into Sussex to see the gliding at Ditchling. He landed at Shoreham Aerodrome and drove to Ditchling.

The weather on the way back was misty and it was steadily getting worse. It appears that Dr. Reid was attempting to make a forced landing owing to the rapidly increasing darkness in a field adjoining East Sutton Park and did not see a belt of high fir trees until it was too late. He apparently opened up his engine to try to clear them but he struck one of the trees and a wing of his machine was torn off.

Miss Burnside was instantly killed. Dr. Whitehead Reid was removed to the West Kent Hospital, where he died next day without recovering consciousness.

#### Dr. Whitehead Reid.

The death of Dr. Whitehead Reid is one of the worst blows that Civil Aviation has had for a long time. He was one of the earliest private owners in this country and was regarded as being an exceptionally careful pilot, though his undoubted ability and skill enabled him to handle his machine in a way which removed him far from the slow and steady type of aviator who is so often referred to rather contemptuously as the "safety first" type by his more reckless contemporaries. Dr. Reid was distinctly a safety first pilot of the best type.

His accident is therefore the more extraordinary and can only be attributed to his delaying his start for home till he was overtaken by combined darkness and bad weather.

Edward Douglas Whitehead Reid, M.B., was forty-seven years of age at the time of his death. During the War 1914-18 he served in France as surgeon at the Duchess of Westminster's Hospital and later he served with the Egyptian Expeditionary Force. He learned to fly soon after the War, as the result of being attracted to aviation by the Light Aeroplane Meetings at Lympne, and he soon became a familiar and unusually well-liked and respected member of that section of the aeronautical community which gathers together at flying meetings and air rallies.

Professionally he was Senior Surgeon at the Kent and Canterbury Hospital and officially surgeon to the Archbishop of Canterbury. In August 1929 he was appointed to the Medical Branch of the Auxiliary Air Force, with the rank of Flight Lieutenant, and was attached to 601 Squadron.

As an individual he was one of the most likeable men anybody could hope to meet. He was the typical English sportsman in every way and combined with his sportsmanship real brain-power and intelligence of a high order. Everybody concerned with British Aviation will mourn his loss deeply.—C. G. G.

### THE ROBINSON REDWING.

The side-by-side or sociable seating plan for light aeroplanes seems to impel their designers to choose names from more or less sentimental ballads. Recently we examined and flew the Robinson Redwing, which is one of the two side-by-side types built in England. The particular machine flown was the first Redwing ever built. It had a 4-cylinder double-opposed Hornet engine, whereas the new type, illustrated below, has the Armstrong Siddeley Genet and other improvements. What follows on the subject of flying qualities, therefore, applies to the first type only.

There is a natural and general impression that a wide fuselage must necessarily mean a high resistance, but actually fineness ratio is not so important as otherwise clean design, and the Redwing does a creditable 94 m.p.h. with 75-80 h.p. to prove it. Even so, high speed has been deliberately sacrificed to those qualities which make a good private owner's and training machine. Private owners are frequently highly-skilled pilots but there is good reason for catering for the comparative dud if private flying is to increase independently of the death rate. Some such philosophy inspired the Redwing.

#### Construction.

The fuselage is a plywood box, fabric covered, and provided underneath with a large trap which permits easy, and therefore thorough, inspection. The tail surfaces are full cantilever structures of composite metal and wood, the rudder is balanced and hinges on a large fin. Controls are wholly internal and cables are used only for a straight pull, as all pulleys and fairleads are eliminated by the use of push-pull rods. The ailerons, which are fitted on the lower wings only, are similar.

The wings are of normal wooden construction with box spars. They are made to fold and have slight dihedral and stagger.

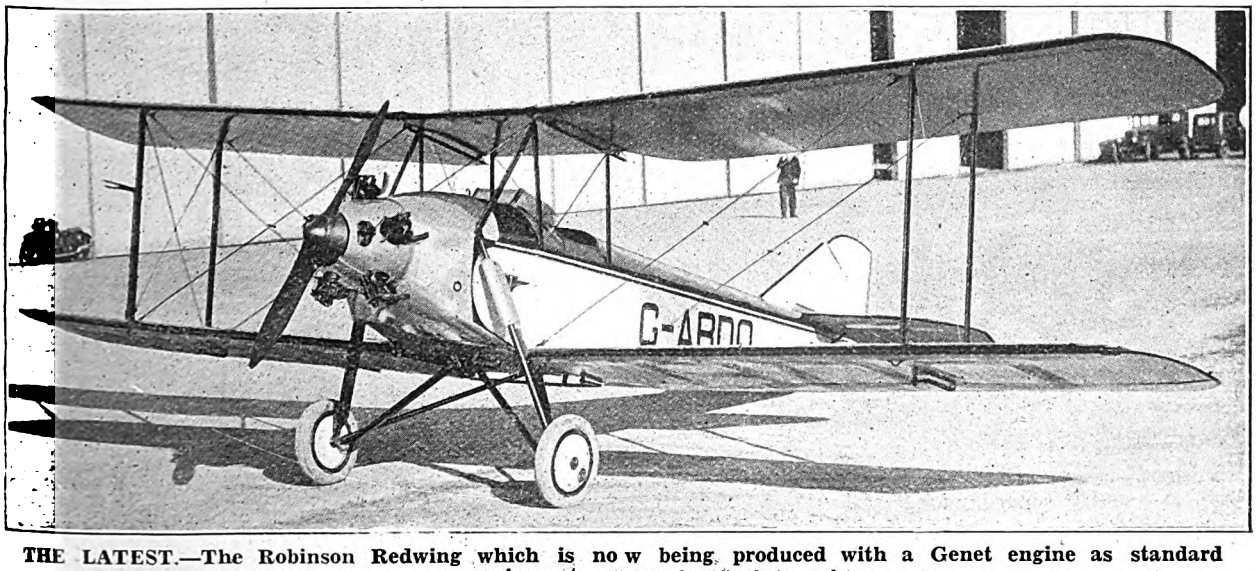
The undercarriage is of the divided pyramid type with the shock-absorbing member attached to the top longeron on each side. Both rubber in compression and double-acting oleo cylinders are used, and they give a total travel of seven inches. The normal track is over six feet wide.

The side-by-side seats are slightly staggered, to give elbow room and better visibility to the pilot, who normally occupies the seat on the left,—which is the forward one. Dual control can be fitted, and the throttle is in the middle. There is a full range of instruments on the dashboard.

Extras which may be supplied at additional cost include dual control, compass, slots, wheel brakes, extra tankage, cockpit heater and special colour schemes.

#### Impressions in the Air.

The cockpit is accessible from one side only by a door, and two large men are a fairly tight fit. Mr. J. K. Lane, one of the designers, said that the earlier fuselage was made narrow as an experiment, but future models would be two or three inches wider, which will make all the difference. On the ground the view is a little restricted on one side, as is bound to happen in all side-by-side machines, but the flat A.B.C. Hornet engine permitted a very low cowling and the obstruction was minimised noticeably.




**THE LATEST.—The Robinson Redwing which is now being produced with a Genet engine as standard equipment.**—(*"Aeroplane" photograph.*)

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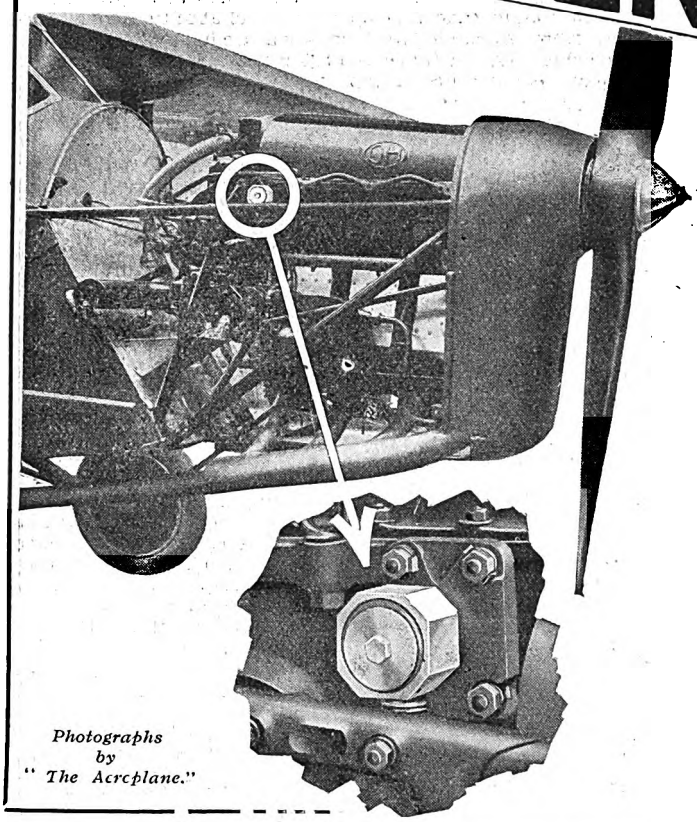

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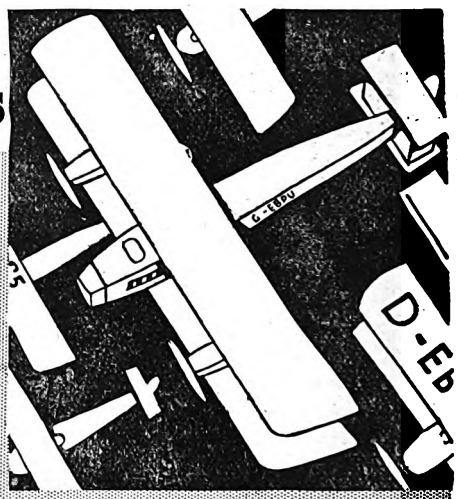


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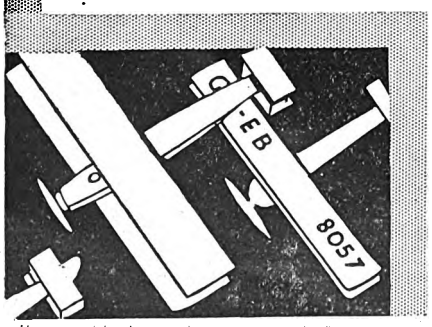


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# COMMERCIAL AERONAUTICS.

## CIVIL AVIATION IN AUSTRALIA.

There are now 7,967 miles of regular air service routes in Australia, and they enable the continent to be practically circumnavigated and at least crossed quickly and comfortably. The weekly mileage is 30,940, so that well over a million and a half miles are flown on schedule every year.

The regular services which are subsidised by the Government for the carriage of passengers and mail are as follows:

*Perth—Derby*: West Australian Airways Ltd. Once a week each way over a 1,500 mile route.

*Derby—Wyndham*: W.A. Airways Ltd. 600 miles, weekly during eight months of the year.

*Perth—Adelaide*: W.A. Airways Ltd. 1,500 miles, weekly each way.

*Brisbane—Camooweal*: Q.A.N.T.A.S. Ltd. 1,300 miles, weekly.

*Cloncurry—Normanton*: Q.A.N.T.A.S. Ltd. 215 miles, weekly.

*Camooweal—Daly Waters*: L.A.S. Company. 475 miles, weekly.

The following are regular services operating without Government subsidy. Some of them carry mails.

*Adelaide—Renmark*: Commercial Aviation Co. 130 miles, three times weekly.

*Adelaide—Streaky Bay*: Eyre Peninsular Airways Ltd. 310 miles, twice weekly.

*Adelaide—Broken Hill*: Eyre Peninsular Airways Ltd. 260 miles, once weekly.

*Sydney—Melbourne*: Australian National Airways Ltd. 485 miles, daily.

*Sydney—Brisbane*: Australian National Airways Ltd. 500 miles, daily.

*Brisbane—Toowoomba*: Aircraft Pty. Ltd. 728 miles, twice weekly.

*Brisbane—Townsville*: Queensland Air Navigation Ltd. 728 miles, twice weekly.

On the above services 19,982 miles are flown each week.

The aeroplanes used on the regular Australian routes include D.H. Hercules (three Bristol Jupiters), Avro Ten (three Lynxes), Avro Five (three Genet Majors), D.H.50 (Siddeley Puma), D.H.50a (A.D.C. Nimbus), Giant Moth (Jupiter), Sopwith Antelope (Puma), Anec III (Jaguar), Avro Trainer (Mongoose), Avians (Cirrus and Hermes), Junkers 13 (Junkers L5), Fokker Universal (Wright Whirlwind), D.H.9 (Puma), and Waco 10 (Whirlwind), D.H. Moths (Gipsy).

In New Guinea several companies operate from the Coast to the goldfields some 60 miles inland over mountains. For the last three years these companies have increased their operations by leaps and bounds. In 1929 they made, collectively, 2,689 flights, flew 3,344 hours which is 245,775 miles. Passengers carried numbered 2,235, and there were 591,600 letters. The most startling of all the statistics is the freight figure, which reached 2,297,328 lbs. in 1929. This is more than ten times the gross amount carried in Australia during the same period, and is explained by the fact that the mines need heavy machinery and can only get it up by air. Stated in ton-miles the difference would be less striking because of the short haul on the New Guinea route.

In New Guinea the most successful machines are the Junkers W34b with three Bristol Jupiters.

Flying Clubs in Australia are doing the work for which clubs were first formed and are increasing in number and membership. Queensland has two clubs, New South Wales five, Victoria three, South Australia two and West Australia three. These fifteen clubs have flown over 10,000 hours in 1929 and trained 161 A licence pilots.

## ACROSS SOUTHERN AUSTRALIA.

For 15 months West Australian Airways have provided a veritable magic carpet of speed and reliabililty across Australia from Adelaide to Perth via Ceduna, Forrest and Kalgoorlie. The distance is 1,500 miles and the four stages as nearly equal as conditions permit. As the greater part of the journey is over unvarying desert the position of intermediate stops was almost optional. The fare on this route ranges from £12 to £18 with a 35 lbs. luggage allowance.

According to so discerning a passenger as Mr. Edward J. Hart, editor and proprietor of *Aircraft*, this trans-Australian service gives an entirely new complexion to travel.

The start from Adelaide is usually made about 10.00 hours, but some latitude is imposed by dependence on the railways for the mail cargo. The mails are put in distinctively coloured bags but no sorting is done on the train, with a resulting delay of variable and quite unguessable duration. At Ceduna a comfortable rest-house and an excellent lunch is provided. The second stage of the journey brings the travellers to Forrest where the night is spent. Here there is a first-class hotel in the middle of desolation.

From Forrest a very early start is made—soon after 05.00 hours—and, after one stop at Kalgoorlie, Perth is reached just before noon.

The contrast between such a trip and the railway journey, an affair of at least two days and three nights with changes of gauge and other frills, is rather striking. So much is this so, in fact, that certain trains have recently been cancelled by the Railway Commissioners,—and by a strange but conceivably explicable coincidence they happen to be those which make the best connections with the air services.

Excellent service has been obtained from the D.H. Hercules (three Jupiters) in 15 months of running, and only two engine stoppages have occurred, but the pay-load is not great enough for requirements, so Western Australian Airways are looking eagerly forward to delivery of the Vickers Viastras (two Jupiters) to maintain a higher cruising speed and to carry about the same load on two engines only.

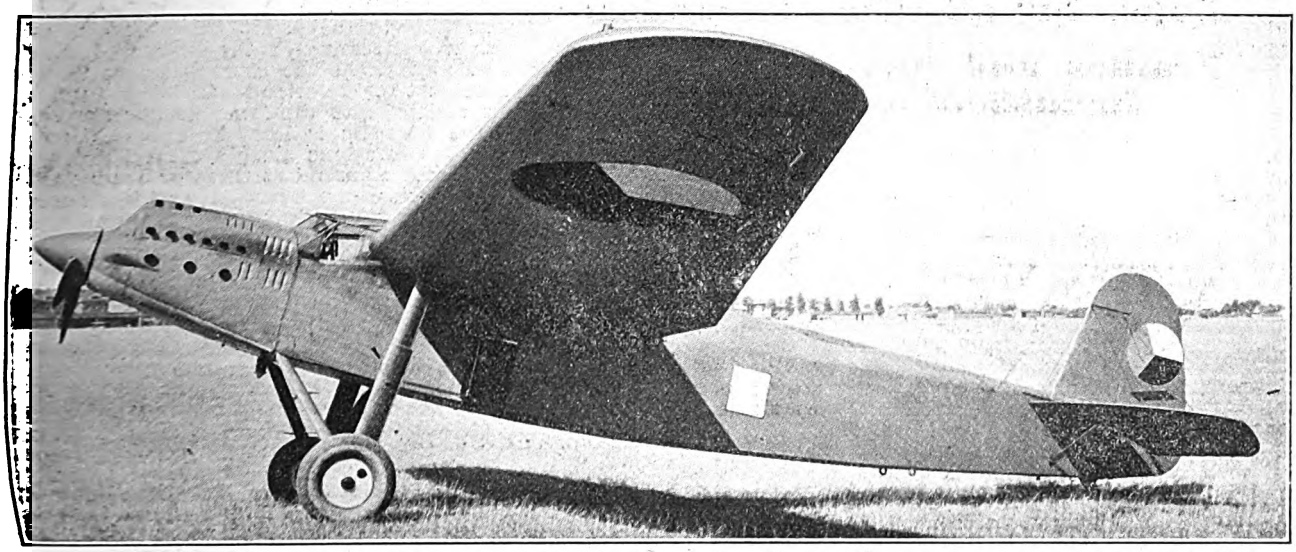
## CZECHOSLOVAK WORLD'S RECORDS.

On Sept. 20 Adjudant Vojtech Svozil of the Czechoslovak Army Air Service broke three World's Records for Speed over a closed circuit of 1,000 kms. (625 miles). These records are those (a) for absolute speed (no load), (b) carrying 500 kgs., and (c) 1,000 kgs. of useful load. The machine is an Aero 42 long-distance bomber monoplane (800 h.p. Asso).

His average speed over the 1,000 kms. with 1,000 kgs. of load was 252.38 km.p.h. (156.728 m.p.h.). As this speed was higher than that made by M. Lasne (Nieuport-Delage 42.C.1 single-seat fighter) on Aug. 25, 1925, with no load, and that made by Mr. Lee Shoenhair (Lockheed Vega monoplane) on Feb. 20, 1930 with 500 kgs. of load, Adjudant Svozil thus put up three record performances in one flight.

On Sept. 29 Commandant Kalla in a Letov S—516 bomber-reconnaissance biplane (800 h.p. Isotta-Fraschini Asso engine) beat the first of Adjt. Svozil's records by covering 1,000 kms. in a closed circuit with no useful load at an average speed of 274.094 km.p.h. (170.212 m.p.h.).

Both the aircraft used were standard production types.



**A CZECHOSLOVAK RECORD-BREAKER.—The Aero 2 monoplane (800 h.p. Isotta Fraschini "Asso" engine) which has broken three World's records. In general it strongly resembles the Fairey long-range monoplane.**

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## THE NATIONAL FLYING SERVICES REPORT.

The first annual general meeting of National Flying Services, Ltd., was held at Hanworth on Oct. 14. Captain the Rt. Hon. F. E. Guest was in the chair.

As foreshadowed in reports before the event the operations of the Company for 1929 showed a serious loss of £39,282. The Chairman, opening his explanation, declared that the directors still hoped for ultimate success and said that further capital was already in sight to enable present difficulties to be overcome.

Operations on full scale were not well under way until December, 1929 owing to delayed deliveries of aircraft, training of personnel, etc. By the spring of 1930 stations were operating at Hanworth, Reading, Hull and Leeds, with Nottingham following on towards the end of the period. Blackpool and Stoke-on-Trent will be under way as soon as work by the respective municipal authorities is finished.

Adverse factors which prevented the flying season of 1930 from recuperating more than it has done of the development expenditure were given as follows: the weather has been abnormally unfavourable during the summer and the country has been suffering from industrial depression; only £740 of the promised Government subsidy has been earned, the contracts for aircraft undertaken by the Company have not resulted in the expected commercial returns and constructional work has been delayed, generally by bad weather.

In an effort to face the difficulties strict economies have been observed, all directors' fees were waived, voluntary reduction of salary went into effect for the management, the staff was reduced and flying charges increased. The retrenchment process is still under way.

Previous estimates of running expenses were thus reduced in practice, but the revenues were much less than expected. Further, earnings were made for little more than 11 months whereas the expenditure covers a period of 16 months.

In spite of the disappointing returns the demand for the Company's services has grown steadily in all departments as the following figures indicate:—

The membership has trebled in eleven months from 494 to 1,564. The paid flying hours have gone up from 701 to 1,288, and with the seasonal fluctuations the average of the later months has been double that of the early ones.

In April 1930 the air-taxi mileage was 3,234 and has steadily increased to 6,594 in July. In the best month of the summer, June, 5,798 passengers were carried.

Gross revenue for the whole period of operation has been about £70,000, and the Chairman referred to this as a "development" period which was practically dead for revenue purposes.

Estimates for the coming year, on the basis of economies made and projected, give reasonable hope for a profit. These calculations allow for some increase in revenue from an improved workshop organisation and better serviceability of aircraft, but no allowance is made for growth of membership, better average weather or the improvement in certain aircraft which suffered development troubles.

The Company's fleet now includes 52 aircraft. Hours flown number 13,000 altogether. The pilots trained vary in age from 17 to 70 and hail from all the Dominions, Egypt, France, Spain, Hungary, Germany and South America. Among the foreign cities to which N.F.S. taxi services have flown are Lyon, Nice, Cannes, Cologne, Berlin, Salzburg, Hamburg, Copenhagen and Oslo.

## CANADIAN AIR-RAIL ACTIVITIES.

Sir Henry Thornton has declared that the Canadian National Railways, co-operating with other transportation corporations, intend to secure a substantial partnership in commercial airway companies and thus there is interest in noting the development of air activities in that Dominion.

During 1929 commercial aircraft companies operating in Canada carried 86,242 revenue passengers; 430,636 pounds of mail; 9,903,908 pounds of freight and express parcels, with a total mileage of 6,284,079. In addition, the Federal and Provincial Governments maintained special patrols for topographical mapping, forest fire protection and fisheries, the latter particularly on the British Columbia coast, where a long and indented shore line previously offered many opportunities for illegal fishing.

During the current year, 88 companies, with 445 licensed planes, are engaged in commercial aircraft operations from 77 licensed airdromes or air harbours. Under Governmental control there are 23 light aeroplane clubs, with a membership of 5,233 and 65 aircraft.

Extending the commercial air routes in the hinterland of Canada to a point approximately 1,500 miles beyond the nearest station on the Canadian National Railways, an aeroplane piloted by Mr. W. E. Gilbert and carrying six passengers and the first batch of mail sent by air to a point north of the Canadian mainland, recently completed a flight to Herschel Island, in Mackenzie Bay, north of the Arctic Circle. The flight reduced to less than two days a journey which formerly occupied several weeks by steamer and canoe and could be made only in the Summer time when the rivers and bays are free of ice.

The Canadian Government last year inaugurated an air mail service to the trading posts in the north-west territories as far north as Aklavik, the northernmost settlement of British-Canadians on the Canadian mainland, and these settlements, formerly cut off from civilisation during the winter were kept in touch with "the outside" through the medium of the aeroplane.

The new service to Herschel Island extends communications by air some 250 miles further north.

## BLIND LANDING IN AMERICA.

A system for the blind landing of aircraft by radio beacons is described in the Air Commerce Bulletin of the U.S. Department of Commerce dated Aug. 15, 1930. None will pretend that the plan is devoid of some rather undesirable complications, although these have been kept to a minimum, or that a pilot could bring a machine in by its means without a good deal of practice. It is, however, without any possible doubt a foretaste of something which simply must arrive before air transport can compete on even terms with terrestrial carriers. The terrors of darkness are still too great, and of fog they are paralysing.

The scheme depends absolutely on beam, or directional, wireless, and no less than four separate beams are used. They are all of different frequencies. Although they are in simultaneous and continuous operation they only concern the pilot one at a time. The only exception is a very brief period indeed, which presents no complications.

The expensive, weighty and complex portions of the apparatus are all on the ground and are easily portable for adjustments to wind. The portion installed in the aeroplane consists of two receiving sets, two aerials, and various instruments, which weigh a total of 15 lbs

The theoretical process is somewhat as follows:—

The pilot is flying his course guided by the ordinary radio beam now in use on many of the American mail routes. The reception of this beam signal is by an instrument which shows two vibrating reeds tipped with white or luminous paint. So long as the two reeds vibrate on equal arcs the aeroplane is on its course. This portion of the equipment is in general use, and works well.

In due course the pilot arrives over the beam transmitting station and is warned of it by his instrument. Meanwhile he is receiving weather, wind and condition reports and advice about landing through his ear-phones.

When over the transmitting station he switches over to the frequency of the second beam, which is the localising beacon, and starts a wide circuit which will take him round the airport. In due course he runs into this localising beam, which is directed down the centre of the runway which he is to use, and can be picked up several miles away. He immediately turns into it, and his reed indicator guides him just as it did along the main route beacon, but this time towards the landing runway. An instrument gives him his rough distance from the transmitter on a visible scale.

As he gets into this beam he throws in the switch of his very high-frequency receiving set, and the landing beam registers on another dial, which tells him whether he is above or below his proper path of approach. The intensity of this beam is naturally greatest in the middle of its cone and close to the transmitter.

The instrument registers correct height at a certain intensity, which is first received in the middle of the beam but at a distance away. As the aircraft nears the transmitter the instrument registers too much height unless the gliding path is directed into the lower border zone of the beam, where the intensity is less. This operation automatically guides the aeroplane along a curved path, which brings it parallel to the ground at three or four feet.

As the aircraft passes over the boundary of the aerodrome a beam at right angles to its flight path produces a note in the pilot's earphones which fades to zero as he passes the boundary, and this warns him to pay closer attention to the landing beam than to the localising or direction beacon, and also to throttle down until his speed is within a mile or two an hour of the normal landing speed.

Complication has been reduced by fitting automatic volume control on all the receiving sets and having the frequencies fixed so that tuning is unnecessary. All the pilot has to do with the radio set is to switch over once from the route to the localising beacon, and then switch on the landing beam receiving set.

Even so the number of things requiring his attention do not leave time on his hands, to judge from the recital of the landing process. When he flies into the localising beam he must make a fairly sharp turn to stay in it and get onto his straight course by means of the reed indicator and his turn-and-bank indicator. . . .

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In addition to watching these and attending to his throttle, his attention is also required to the rough distance indicator and then to the landing beam indicator. The latter is very important, as his whole landing process depends upon it, but if he gets off direction very much the landing beam indicates incorrectly, so the reeds are equally vital until the moment when the boundary beam signifies that the landing-ground is underneath and not far away.

The failure of any of these aids would automatically make a blind landing suicidally dangerous, and as wireless is hardly out of the temperamental stage further developments will probably come before pilots fly calmly from fog-bound airports through continuous cloud to fog-bound destinations.

The success so far attained, which includes absolutely blind circular flights, including take-off and landing, shows that the problem is being tackled in a determined manner.

Meantime America is getting all the free advertisement out of it, and if anything is being done in this direction in this country it is being very carefully hidden.

## EFFICIENCY IN CANADA.

Early in September at the Canadian National Exhibition at Toronto there was held a Speed and Efficiency Competition for seaplanes for a trophy valued at $1,000, which has been presented by the Imperial Oil Company of Canada, Ltd., for annual competition.

There were four entries for this contest, a Bellanca Pacemaker (300 h.p. Wright Whirlwind engine), a Fairchild FC2 (225 h.p. Wright Whirlwind engine), a Stinson Junior (210 h.p. Lycoming engine) and a Fokker Universal (300 h.p. Wright Whirlwind engine).

The contest was flown over a 15-mile triangular course for a total distance of 60 miles and efficiency was determined by the following formula:—

$$\frac{\text{disposable load x speed}}{\text{horse-power.}}$$

The Bellanca Pacemaker which was flown by Mr. C. R. Troup of Bellanca Aircraft of Canada Ltd. started from scratch. It was first both in speed and efficiency and was awarded the trophy and the first cash prize of $2,500.

The Fokker Universal was being flown by Mr. Charles Sutton and in a turn on the second lap a wing-tip touched the water. The machine cart-wheeled and the pilot was thrown out and killed. His mechanic escaped injury.

The following shows the results of the contest:—

| Speed. | Efficiency. | Machine. | Disposable load. | Speed. | Eff'cy. mks. |
|---|---|---|---|---|---|
| 1st. | 1st. | Bellanca Pacemaker | 1967 lbs. | 131 m.p.h. | 958.9 |
| 3rd. | 2nd. | Fairchild FC2. | 1260 lbs. | 105 m.p.h. | 588. |
| 2nd. | 3rd. | Stinson Junior | 898 lbs. | 110 m.p.h. | 485. |
| — | — | Fokker Universal | 1265 lbs. | — | — |

## TOO MANY REVS.

A revolutionary atmosphere is invading Brazil and martial law has been decreed until Dec. 31, 1930.

The Government has ordered all banks to be closed and has suspended all air mail services until further notice in an effort to prevent speculation in the exchange.

This ruling will affect the air mail services operated by the *Compagnie Générale Aéropostale* to Europe and by the Pan-American Airways with North America.

## GREENLAND'S ICY MOUNTAINS.

Air Ministry Notice No. 11 of this year states that permission for flights to or over Greenland must be obtained in advance from the Danish Government, and application for such permission should be addressed to the Danish Legation, 29, Pont Street, London, S.W.1. No supplies of aviation fuel, oil, spare parts, etc., are available in Greenland. Arrangements for the supply, transport and storage of the necessary stores must, therefore, be made prior to the start of the flight.

## ON A FRENCH AIR LINE.

The following letter from a British aviator will be found of interest by all who are concerned with Air Transport:—

Recently I happened to be on the coast of Morocco and wished to return to England quickly. I was in the town of Sali, but no one there could tell me of the location of the aerodrome. I crossed the river to Rabat, and after much effort with mongrel French-Arabic, got driven to a squadron of Breguets, evidently maintained for Government purposes. Rabat is the political capital of French Morocco.

At this place a polite Foreign Legion sentry showed me the way to the Civil Aerodrome. This was on the far side of the military Aerodrome. It was a large undulating field with long grass like the Blériot Aerodrome at Toussus-le-Noble. I booked a passage for the following day.

A Ford car picked me up at my hotel at 4.45 a.m. and the aeroplane arrived from Casablanca at 5.30 a.m.,—which is Latin for 5 a.m. It was a high wing Latécoère monoplane, 500 Hispano-Suiza. Three Americans came with me as far as Malaga, but for the rest of the time I was alone and there was very little mail.

The first stop was at Tangier in an aerodrome right among the Riff Mountains. An aged Moor brought us coffee, for which he would not accept payment. We stayed there for ten minutes while petrol was taken on, and then ran across the Straits to Malaga. It is a long time since I learned that the school description of Gibraltar being an island in the middle of the Straits was incorrect, but not till now did I realise the ineffective location of the place.

We waited ten minutes only in Malaga and then went up the coast to Alicante. There I changed to a similar machine, the engine of which was already being swung as we taxied in.

We hugged the coast up to Barcelona, stayed five minutes only there and then went across the Pyrenees to Toulouse. We climbed to 8,000 feet going over the mountains but it was very rough. The bumps were not big but continuous.

At Toulouse the pilot overshot and had to go round again. At the *douane* the officials were most considerate, my baggage was examined without delay and I was put in a comfortable car and taken to the station where I could get the night train to Paris.

All the way across Spain I was not worried by Spanish officialdom. But on the other hand, when my wife drove up the coast and crossed the strip of Spanish territory south of Tangier, she was held up for two hours while they telephoned the last Spanish Consulate at which she had called.

If the aerodromes had been more suitable I would have been much impressed with the performance of the thick-wing monoplanes used. Without exception, the aerodromes are bad. They are far too small.

At Toulouse, where the country is flat and land must be cheap, excellent buildings are provided but the ground cannot be more than 20 acres. It is simply a narrow strip in front of the hangars and can only be "one way."

Even when our pilot overshot, he had cleared the boundary lights coming in by less than 2 feet. Of course, the machine was lightly loaded but if it had had its full complement of eight passengers and mail aboard, it seems impossible that it could have got off in the space.

The most pleasing characteristic of these machines is the comparatively small change of attitude in taking off and landing. This, of course, is to be expected with thick-wing characteristics, but it is none the less pleasant. It is decidedly uncomfortable after enduring incipient air-sickness for some time to experience the sudden nosing down when going into a glide. This was hardly discernible.

The take-off was, of course, alarming, but for the average passenger the fact that there was no hoick at the end of the run must be an advantage.

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# TRADE NEWS

### A TRADE TRANSFER.

Mr. F. Rodwell Banks, who for a considerable time has been Assistant Manager of the Technical Sales Department of the Anglo-American Oil Co. Ltd., is transferring within the next few weeks to the post of Technical European Representative of the Ethyl Gasoline Corporation Inc. His address in future will be Aberford House, Victoria, S.W.1.

As almost everybody knows the Pratt's Petrol people, which means the Anglo-American Co., were the first to tackle seriously the introduction of ethyl-lead into petrol. The working alliance thus brought about between the Anglo-American Co. and the Ethyl Corporation accounts for the transfer. And incidentally, Mr. Banks' wide knowledge about engine design and its influence on fuels is likely to be of high value all over Europe.

Incidentally, Mr. Banks, whose duties have in the past necessitated his flying a great deal as a passenger, and whose new duties all over Europe will probably make still more flying necessary, has recently qualified for his Pilot's "A" Licence. That one who has been so long and so intimately concerned with the development of British Aviation should in future take his life in his own hands is very fitting. He did his training with the Brooklands School of Flying under the personal tuition of Mr. H. Duncan Davis and like all other Brooklands pupils he is enthusiastic about the combined thoroughness and quickness with which the Brooklands School does its work.

His many friends in the Trade will wish Mr. Banks every success in his two new dual rôles, as a pilot and as the European representative of Ethyl.

### THE MARKING OF IMPORTED TOOLS.

On June 2, 1930, the Board of Trade made a Direction to the effect that tools and implements covered by Part 4 of the Merchandise Marks (Imported Goods) No. 5 Order, 1929, imported before Dec. 17, 1929, which are sold or exposed for sale before July 1, 1931, may bear an indication of origin applied to each article by means of a label securely affixed or attached thereto, instead of being required to have the indication or origin applied by die-stamping or other mode of impressing, etching, engraving or casting.

The question whether the Merchandise Marks (Imported Goods) No. 5 Order, 1929, should be amended, either in accordance with the terms of the above Direction or otherwise, having been referred to the Standing Committee appointed by the Board of Trade and representations having been received on the subject from certain interests concerned the Committee will hold an Inquiry into the matter at 11.30 a.m. on Monday, Nov. 17.

The Inquiry will be held at the Board of Trade Offices, Great George Street, London, S.W.1. Any communications on the subject should be addressed to the Secretary, Mr. E. W. Reardon, at that address.

### QANTAS PROGRESS.

The financial depression in Australia seems to be having no adverse effect on the demand for air services. The *Qantas Gazette* gives the following figures for the month of August:—Route passengers, 236; Freight, 4,620; Miles flown, 26,537.

On the assumption that at least five-sixths of the Australian people have never flown, and that a flight is the best possible advertisement for Aviation, Qantas are arranging a series of educational tours throughout Queensland and the Northern Territories.

### INTERNATIONAL COURTESY.

The following is the text of a telegram received by the De Havilland Co. from the Governor of Portuguese Timor:—

Airman Matthews landed on landing ground here very well first machine to land in Dilly Portuguese Timor Puss-Moth engine and machine wonderful landing splendidly.

Its interest would appear to lie jointly in the kindness of the Governor in sending the cable, and his obvious interest in aviation.

### DARDELET SECURITY.

The address, offices and works of the British Dardelet Threadlock, Ltd., whose self-locking nuts and bolts were described in The Aeroplane for Oct. 15, 1930, is now Chase Road, London N.W.10 (Telephone: Willesden 6616—3 lines). The Share Transfer and Registration office remains at City House, 48 Cannon Street, London, E.C.4 (Telephone: City 2452).

### TWO ERRORS.

Owing to a mathematical error, possibly caused by an insufficiently lubricated slide-rule, the maximum metric speed of the Desoutter Sports Coupé was incorrectly given in the issue of The Aeroplane for Oct. 8, 1930, as 164 km.p.h.

The maximum speed of this machine is fairly well-known to be 125 m.p.h. which is approximately equal to 200 km.p.h.

Another regrettable error which crept into the same issue concerned the wing-loading of the Desoutter Mk. I Sports Coupé. Owing to the capriciousness of a decimal point this loading was given as 100 lbs. per sq. ft. whereas it should have read 10.0 lbs. per sq. ft. However a simple division sum: 1,900 lbs. (loaded weight) ÷ 190 sq. ft. (wing area) should have provided the correct solution to all but the unmathematically-minded.

### MANY INVENTIONS.

On Saturday last Croydon Aerodrome welcomed Mr. Jack Matthews back from his adventures with sincere joy. On his outward journey Mr. Matthews, whose piloting experience was not very extensive when he left for Australia, put up an extremely stout show by flying from Marseilles to Catania and next day from Catania to Benghazi, two sea crossings of round about 550 and 450 miles respectively. At Jask he met some sort of silly Satrap who would not believe Mr. Matthews had permission to fly through the country, although the Satrapian files contained the permission, which was discovered with loud bleats of surprise after the flight had been delayed four unnecessary hours.

Complicated filing systems of an incomprehensible nature have ever been the bugbear of Persia. What said the poet Omar,—

Come, search the files, what boots it to repeat
How time is slipping underneath our feet.
Unborn to-morrow and dead yesterday,
Why fret about them if the files be neat.

Apparently Jack Matthews owes much to that nimble little forest dweller the elephant, which casually barges tracks through bamboos and undergrowth which would be impenetrable to a man. But for these tracks Jack does not believe he would have got through the jungle after his crash, which, by the way, did not even break the prop.

Recently a gentleman rushed madly into the Duty Office waving an unprepossessing mass of solid rubber, which he swore had descended in a red-hot condition onto his roof from an Argosy, damaging his tiles and intoxicating his family with the fumes of burning rubber. An official pointed out to him that Argosy tyres are not solid, that they do not drop off and that Argosies by no means move fast enough for their tyres to become red-hot from atmospheric friction. It was suggested that the lump of rubber had flown up from one of those lorries whose thumping progress along the roads suggests that their wheels are square; but this story failed to give satisfaction.

For ourselves we should have told him that doubtless some passing phœnix, well known to build its nest of hot indiarubber, thus obtaining a pleasing vulcanised effect, had dropped the bit of building material from a great height. This story is as good as the one about the lorry and quite as likely as the one about the Argosy, and is more difficult to argue upon than either of them.

Mr. Clark, of Personal Flying Services Ltd. has gone off hob-nobbing with the aristocracy and gentry of darkest Ethiopia, where no doubt Prester John will be tickled to death to meet him. He has gone in the firm's Junkers on a Press job connected with the forthcoming coronation.

Three survivors of R.101 came through from Beauvais to Croydon by Imperial Airways the other day. They were

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surrounded by a large number of camera men as soon as they landed, and they assured all and sundry that they certainly intended to fly again and that they were now attached to the R.100.

Two Desoutter monoplanes were shipped to Australia last week in response to definite orders, and the new Robinson Redwing, with wider fuselage and a number of minor improvements, was flown on Sunday by various pilots, who pronounced it an excellent machine and an advance on the first one.

A writer in one of last Sunday's newspapers filled a whole page which might otherwise have been left refreshingly blank, with a bitter tirade against the Air Ministry, and incidentally with a lot of impertinent advice to Lord Amulree how to run his new job. The article appeared to be based on the writer's own self-opinionated prognostication that "The odds against the truth being allowed to come out during the inquiry into the R.101 disaster are incalculably enormous."

When we read that "It (the Air Ministry) is at present a stronghold of militarised arrogance and insolence . . . it gives itself insufferable airs of infallibility," we suspected the writer of some personal bitterness. And when he went on to issue a grandiloquent ultimatum that "Lord Amulree must teach the Air Ministry to treat the Press with respect," we knew for certain that someone had trodden on the little fellow's corns.

The reason why the Press were to be treated with respect was interesting. It was because "The newspapers represent the taxpayer, who pays for the Air Ministry." But, fair and softly, child of the bilious inkhorn! Do the papers represent the taxpayers or are they suffered in silence by the taxpayers; and if they represent the taxpayers, kindly answer us this: Who the devil elected them to do so? Should not one writing of "Arrogance and insolence" and "Insufferable airs of infallibility" take a good look at the beam in his own eye before postulating what most people dislike the idea of intensely, to wit, a Newspaper Dictatorship?

A little down the column the real reasons for the article were naïvely brought to light. Apparently the Press were despitefully used in the matter of reserved seats on the special train to Cardington, and some official (whom Allah preserve) suggested that they should travel in the luggage compartment. At Cardington they were placed in a cabbage patch behind such incredible obstacles as a huge mound of earth and an Air Force band, which (said the writer peevishly) could not play. Reporters who tried to climb the earthwork were driven away by a Bandmaster, and, to crown all, a high official of the Air Ministry was alleged to have used unprintable language about the Press (the alleged dirty, dirty dog). All this was very wicked of the Air Ministry, but it does show, does it not? that the article was hopelessly biased by personal vindictiveness and should be treated accordingly.—SPRY.

[Whether Spry is referring to a singularly ill-mannered and ignorant attack on the Air Ministry in *The Sunday Express* one does not pretend to know. But certainly such an attack was published therein, and one would merely add that next Sunday Mr. Douglas, who signed the article, might explain why his paper sent a theatrical critic to deal with a solemn event which was not suitable for treatment as a public entertainment.—C. G. G.]

## IN THE CITY.

By G. P. Kerr.

[*These notes appear once in every Stock Exchange account and are intended to be of interest to those who hold or intend to hold investments in companies concerned directly or indirectly with aviation.*]

Contango days: Oct. 20, Nov. 3.
Account days: Oct. 23, Nov. 6.

This has been a most depressing fortnight in the City. Apart from gilt-edged stocks almost all securities are lower on the account—and aviation shares are no exception.

Imperial Airways are 1s. down ex the recently declared dividend of 5%—paid, it should be noted, not on £1 but on 15s., for the shares were not fully paid until last April. At one time the shares dipped to 18s. 3d., and the market is beginning to think that the maintenance of the dividend at 5% on the fully paid shares is all that can be expected next year.

De Havillands have fallen below 30s. again, and Handley Page have weakened to 10s. 9d. These 10% Participating Preference shares do not usually come on the market in large lines, as the amount in issue is small and strongly held. But there is, I hear, at present a seller of some thousands of shares at around 10s. 9d.

The much advertised forty-seater machines ordered by Imperial Airways have certainly ensured adequate work to the Company, but it would be interesting to know how far the contract is proving profitable. Talk of the Government re-equipping night bomber squadrons may affect the price level of the shares, but as someone wittily remarked, "the Company's prosperity probably hangs not so much on its contracts as on its slots."

If the Ordinary shares of The Hawker Engineering Co. Ltd. were obtainable in the market there would have been lively dealings in them when news of the contract with the Air Ministry for Harts and Furies provided a middle page story for the daily papers last week (after the news had been published in The Aeroplane). It was all the more surprising therefore that the Ordinary shares of Rolls-Royce—who are supplying the engines—should have encountered an appreciable amount of selling. They were quoted at 39s. 6d.—the lowest level they have touched for the past two years. The Company has *paid* 10% since 1927, and *earned* an average of 17¾%. The Balance-sheet shows a remarkably strong position. Reserves total £654,277 against an issued capital of £818,962. It is probably true that business in luxury cars like business in cigars is not too good at the moment, but aero-engines are now becoming an important section of the Company's activities, which may in time outstrip the turn-over in car business.

National Flying Services held their first Annual General Meeting on Wednesday last, and an incident which occurred in the City the following day deserves repeating. A smart young woman who had recently taken her "A" licence in N.F.S. "chocolate and orange" placed a packet of certificates on her stockbroker's desk with—"What is the price of these?" "Bid you twopence," was the reply. "Why! That's the price of a bar of chocolate!" she protested. "And if I were you, I'd take the chocolate," said the broker.

The Chairman, however, expressed at the meeting the hope that with the "economies already effected and to be effected the Company would show a profit for 1931." But the market regards the prospects of dividends on the Ordinary shares as almost hopeless. Even the 7% £100 Debentures are practically unsaleable at £40. It was stated at the meeting that negotiations were in progress for raising fresh capital, and that there was every prospect of it being raised—"probably involving the issue of further Debentures with certain other conditions."

In view of the Company's financial position it is difficult to guess what these conditions may be. Certain financial houses in the City have been circularised in order to raise I hear another £75,000 of Debentures. There are already £150,000 in issue and details of any new debenture will be awaited with interest.

Among the rest of the aviation share group little of importance has occurred during the past fortnight. A small amount of business passed in Petters, which rose to 22s. 6d., possibly on news that the Company was sending a "circus" of Wapitis to the far East in the hopes of picking up orders from the fighting forces there. Napiers weakened slightly, and Fairey Aviation closed better at 11s. and the 8% Debentures at 100.

| | Making-up Price. Oct. 6 | Oct. 20 | | Making-up Price. Oct. 6. | Oct. 20 |
|---|---|---|---|---|---|
| De Havilland ... ... | 30/- | 29/6 | Nat Flg. Services Ord. 2/- | 4½d. | 3d. |
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| Imperial Airways £1 fy. pd. ... ... ... | 20/6 | 19/- | S. Smith & Son, 1/- Dfd. | 3/9 | 3/9 |
| D. Napier ... ... ... | 10/6 | 10/- | Do. do. £1 7% Prd Ordy. | 31/3 | 30/9 |

## PERSONAL NOTICES.

Deaths.

BARKER.—On Oct. 15, at Halfar, Malta, as the result of a flying accident, L-AC. Edward George Barker, R.A.F.

BLOMFIELD.—On Oct. 15, at Grantham, as the result of a flying accident, Flt. Lt. James Stanley Blomfield, R.A.F.

Flt. Lt. Blomfield entered the Royal Air Force with a short service commission in March 1925 and, after a course of flying training at No. 5 F.T.S., Sealand, was posted to the Aircraft Depot, Karachi. In June 1926 he was posted to No. 60 (Bomber) Squadron at Kohat. He was restored to the Home Establishment in April 1928 and the follow-

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ing August was posted to the School of Technical Training (Apprentices) at Halton. In April 1930 he was appointed to No. 1 F.T.S., Netheravon. He was promoted to Flight Lieutenant in May 1930 and on Sept. 1 was posted to No. 3 F.T.S., Grantham.

BURD.—On Oct. 12, suddenly, at Hinaidi, 'Iraq, John Marsh Burd, M.C., R.A.F. (late Capt., R.F.A.), beloved husband of N. M. Burd and only and well-beloved son of Mrs. G. V. Burd, Vanhouse, South Zeal, Okehampton, and the late Dr. G. V. Burd, Okehampton, Devon, aged 34.

COWIN.—On Oct. 15, at Halfar, Malta, as the result of a flying accident, Maurice Thomas Cowin, Lieutenant, R.N., Flg. Off., R.A.F., younger son of Mr. and Mrs. T. Cowin, of Mauritius.

DEAKIN.—On Oct. 19, at Leigh Grange, Netley Abbey, Norman Deakin, late Major, North Devon Hussars, attached R.F.C. 1916-1919, son of the late George Henry Deakin, of Davenham Hall, Cheshire.

FAWKES.—On Oct. 16, at Cranwell, as the result of a flying accident, Ernest Hamley Fawkes, Flight Cadet. R.A.F. College.

REID.—On Oct. 20, at the West Kent Hospital, Maidstone, as the result of a flying accident, Dr. E. D. Whitehead Reid, M.B., Flight Lieutenant, No. 601 (County of London) (Bomber) Squadron, Auxiliary Air Force.

WILLIAMSON.—On Oct. 15, at Grantham, as the result of a flying accident, AC.2. Cyril Williamson, R.A.F.

WORSLEY.—On Oct. 18, in Windsor Hospital, as the result of a motoring accident, Flt. Lt. Oswald Ewart Worsley, R.A.F.

Flt. Lt. Worsley was born in 1898 and was educated at Merton House and Westbourne Schools. He joined the Royal Naval Air Service in 1914 and served in the Dardanelles, where he was mentioned in Dispatches. He retired from the Service in 1919 but returned in 1921 with a short service commission. He was appointed to a permanent commission in 1925 and was promoted to Flight Lieutenant in July 1927. Flt. Lt. Worsley was a member of the British Team in the Schneider Trophy Contest at Venice in 1927 and was the only competitor besides the winner to finish the course. He was appointed to command a Flight of No. 29 (Fighter) Squadron in June 1929.

### Forthcoming Marriages.

DOUGLAS-HAMILTON—BOWES-LYON.—The engagement is announced between Lord Malcolm Douglas-Hamilton, R.A.F., third son of the Duke and Duchess of Hamilton and Brandon, and Pamela Bowes-Lyon, only daughter of Lieut.-Colonel the Hon. Malcolm and Mrs. Bowes-Lyon, of 71, Cadogan Gardens, S.W.3.

WALKER—IVALL.—The engagement is announced of H. J. Walker, Flg. Off., R.A.F., the only son of Mr. and Mrs. R. H. Walker, of Chadwell St. Mary, Essex, and Doris Ivall, daughter of Mr. and Mrs. P. Ivall, of Cheam, Surrey.

### Births.

AIRY.—On Oct. 16, at Clifton House, Dee Banks, Chester, to Enid (*née* Burnside), wife of E. A. Airy, The Buffs and R.A.F.—a son.

ASTLE.—On Oct. 11, at The Close, Halton Camp, Bucks, to Marghuerita, wife of Flt. Lt. F. H. Astle, R.A.F.—a son.

LUKE.—On Oct. 16, at Woodlands Nursing Home, Glasgow, to Mr. and Mrs. Eric Luke, of Lochiel, Bearsden—a son.

WATSON JEAN.—On Oct. 10 and 11, at Guernsey, to Truda (*née* Grut), wife of Flt. Lt. J. Watson Jean, R.A.F.—twin daughters.

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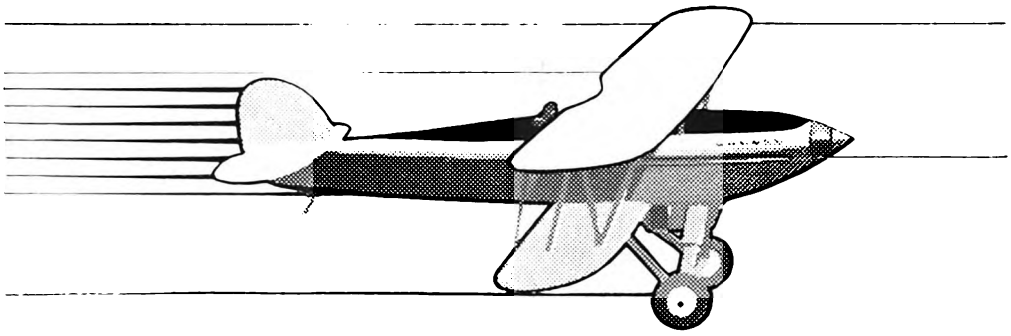

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## ON THE LIGHTER SIDE OF SCIENCE.

This being the last week of the month, and therefore the week in which the *Aeronautical Engineering* Supplement to THE AEROPLANE appears, I take the liberty of discoursing on the lighter side of some of our scientific problems. There is no problem in Science which troubles scientists more than finding the right names for the things which Science discovers. And you will have noticed that although scientists affect to despise the Classics, and boast that they were brought up on the Modern Side of whatever schools they afflicted in their youth, they always search the Classics for their names, and generally mangle the classical languages in doing so.

Take our own pseudo-science for example. We call it the Science of Aeronautics, and divide it into Aerodynamics and Aerodonetics,—at least the scientists do, even if you and I do not. And now, I hear, some of our highbrows in official circles object to calling the motors which we use in aircraft aero-engines. Their trouble seems to be that the word "aero" does not mean anything in itself. And so they argue that an aero-engine does not mean anything.

Surely that is an advantage,—because if the word aero doesn't mean anything and we choose to adopt it and make it mean something, then it can't mean anything except what we mean it to mean. Thus we avoid any chance of confusion with anything else.

Suppose our scientists in High Places choose to call the thing an air-engine. Then they get into all kinds of tangles. There is already a hot-air engine. It isn't any use,—but it exists. And an air-engine might conceivably be a compressed-air engine of some sort. And anyhow, an air engine sounds as if it were something distinct from an oil engine or a petrol engine,—which are in fact air engines, because they use many times as much air as they do gas from their fuel.

An aero-engine might perhaps be called an aircraft engine, as it is concerned solely with aircraft,—like an aircraftman, or an aircraft apprentice. But that is a clumsy term at best. And, in fact, we are overworking the word aircraft rather badly.

It has become too popular within the past two or three years, chiefly because it offers an easy way of getting out of repeating the words aeroplane and machine too often. So journalists, and some real writers who ought to know better, have acquired the bad habit of calling an aeroplane an aircraft, when they definitely mean an aeroplane, as distinct from an airship,—forgetting that an airship, whether big or little, or even a glider, is equally an aircraft.

### OVERWORKED AIR.

The word air is also in danger of being overworked. The R.A.F. has long adopted it for its senior officers in a rather illogical way. An "Air Officer Commanding,"—abbreviated into A.O.C.—means in the Air Force what a General Officer means in the Army, and what a Flag Officer means in the Navy. But the term Air Officer would be more logical if it corresponded with the Army term Field Officer, and were applied to Squadron Leaders and all ranks above. And, on the other hand, the Navy does not use the term Sea Officer at all, although the terms seaman and airman are analogous in the two Services.

On the whole, therefore, the less the word air is twisted to new meanings the better our aeronautical language will be understood by the non-aeronautical people. And, because everybody understands what the word aero is meant to mean, we may as well use it whenever it fits. Actually it ought to find a place in the next edition of the Oxford Dictionary as "an adjectival prefix, implying pertaining to the art, science, or practice, of aeronautics."

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**"PACING THROUGH THE FOREST,**
**"CHEWING THE FOOD OF SWEET AND BITTER FANCY."**

(SHAKESPEARE—*As You Like It.*)

**HEAVY GOING.—Transporting a Fairey III.F (Napier Lion) from Tatoi Aerodrome to Phaleron Seaplane Base, near Athens, as related elsewhere by Mr. McMullin.**

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And that in itself would be begging the question, because it assumes that everybody knows what the word "aeronautics" means. Which, in fact, everybody does know, in spite of the fact that the word "aero" by itself has not received the sanction of our dictionary-makers, and philologists, and etymologists.

If our scientists at the Air Ministry are going to object to the term aero-engine then they must insist on renaming the Royal Aeronautical Society, and the Royal Aero Club (which really is a horrid title, though it could not possibly be improved), and the aeroplane as well. If they bar the term aero-engine they cannot accept the term "aeroplane,"—which is the worst of all, because the aerodynamic surfaces of an aircraft (lighter or heavier than air) are not planes of any kind. So if the word aero is non-existent, and if the surfaces are not planes, obviously such a thing as an aeroplane cannot exist. But it can, and it does, for millions of people all over the World. So what is the good of arguing about it? And they may just as well accept aero-engine also.

### A Scientific Argument.

Scientists are great fellows at arguing. I got mixed up in a beautiful argument the other day between some practical men and some scientists. The substance of it is worth repeating. It was nearly as good as that unfailing source of joy, the argument about whether ham is pork or not.

Have you ever tried dropping that question into a mixed assembly of men and women, when conversation begins to flag? It is sure to make a pleasant party.

All the women will argue at once that if they go to buy ham,—whether a lordly Bradenham at Fortnum and Mason's, or a quarter of a pound, "and cut it thin, please, because we have company coming," at the local *delicatessen* store,—they don't get pork. The men will argue that pork is plain dead pig, and that the moment a pig is killed all of it becomes pork, and so a ham is merely a hind-leg of pork salted. Then somebody will argue the difference between fresh pork, salt pork, pickled pork, and bacon, and ham. And someone will argue that ham is only leg of bacon,—which it is not. And someone will claim that ham *was* pork till it was cured. And someone will bring in Einstein, on the relativity of ham that *was* pork to ham that *is* ham. And you will do well if you escape a riot, with your pet encyclopædia and the household cookery books as weapons.

I once, with a collusive friend, started the argument at Willesden in a first-class smoker full of staid Midland business men on the Birmingham express. The rest were all strangers. We got out at Coventry, and as the train pulled out the others were crowded into the corner we had just left, beating one another's knees for lack of a table or a tub to thump in their impassioned oratory.

### Swinging for Compasses.

This recent argument arose this way:—Somebody asked what is the proper name for that place on an aerodrome where they "swing aeroplanes for compasses"? Now, everybody who has ever had to do with the sea, and lots who have not, know what "swinging for compasses" means. Every harbour has a buoy at which it is done. But try to define the operation and the function of the buoy. It is quite difficult. And one of our scientists, remembering the so-called Great War, remarked that swinging was usually associated with lead.

One practical man, a pilot who commanded a squadron with distinction during the War 1914-18, said that the place is called a "Compass Base," and defined it as "An area allocated for the orientation of aircraft in predetermined directions to facilitate the compensation of compasses."—That sounds rather terrible, but it is perfectly sound, when once you understand that orientation has nothing to do with going East, and merely means swinging round to all the points of the compass,—and that the scientific word orientable merely means swivelling.

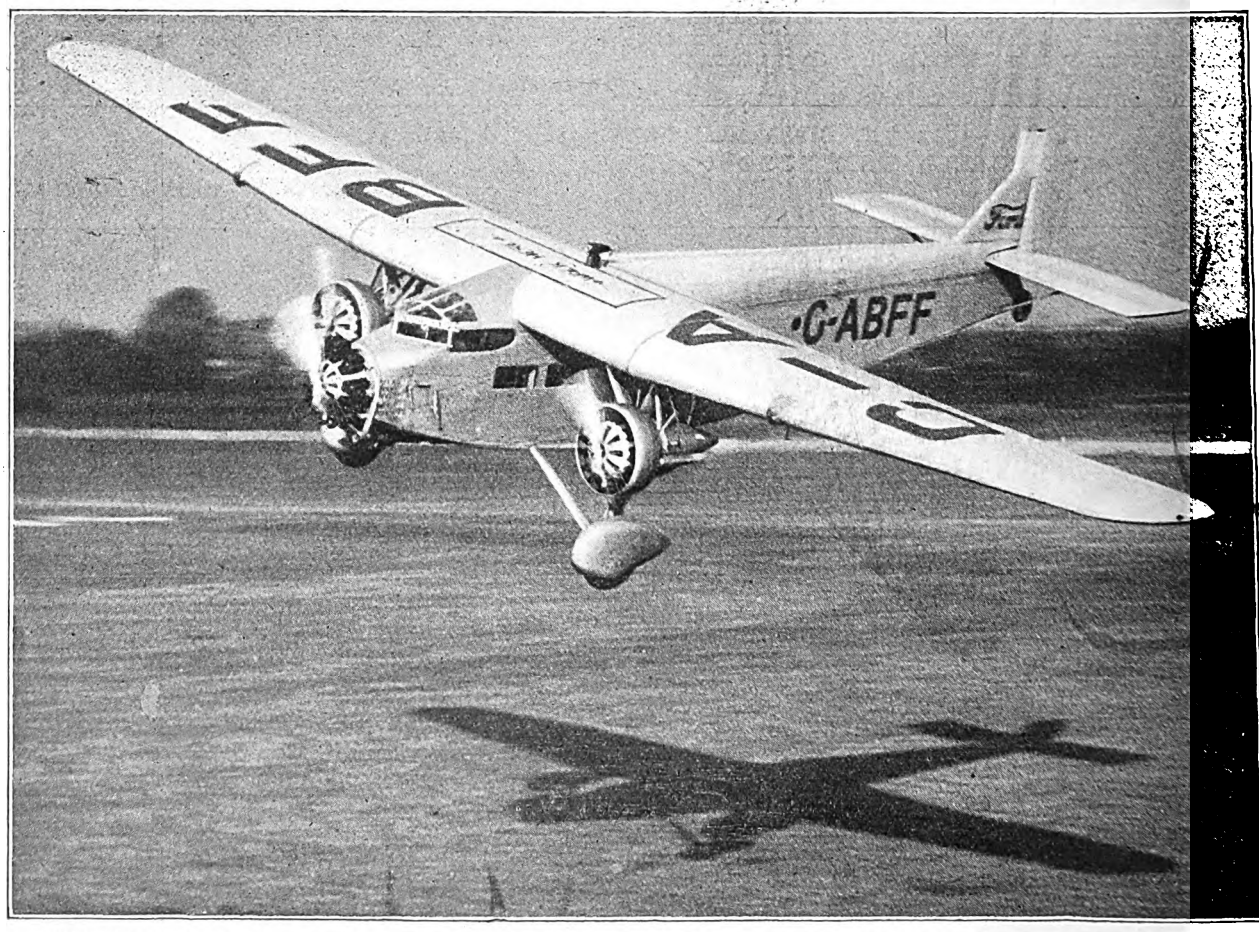
Then somebody objected that the compasses are not compensated, they are adjusted. And then the trouble began.

A scientist argued that when a scientific watchmaker or clockmaker compensates a timepiece against extreme variations of temperature he does it to the inside of the mechanism. And he argued that a compensated pendulum is made so. But that the user of the watch or clock can adjust it, more or less, from the outside, to make it keep proper time, after which the compensated mechanism will take care of it.

From this he, and sundry scientific friends, argued that the compensation of a compass must be an internal business and anything done outside it must be an adjustment.

### What is an Adjustment?

For the benefit of the uninitiated, perhaps I had better explain here that if you take a perfectly good and perfectly healthy compass, and put it in a ship or put it in an aircraft, with masses or iron or steel all round it, in varying quantities, the compass-needle is affected more or less by the varying masses of metal, or by their varying distances from




**AN IMPRESSION OF SPEED.—The Ford Tri-Motor (Wasps) seen from the Control Tower at Heston.**
*—("Aeroplane" photograph.)*

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it, and it so gives various erroneous readings as the ship or air-craft swings round from North to East and South and West and up to North again.

To make it read properly, bits of iron of suitable size are stuck round the outside of the compass, to balance out the effects of the metal in the craft as it points in different directions. This obviously compensates the compass for the disturbance caused by being put in unpleasant proximity to these masses of iron.

Nothing is done to the compass itself. It is not adjusted up or down or backwards or forwards or sideways. Its bearings are not tightened or loosened. It is merely given compensation for disturbance,—which seems the properly humane thing to do.

I ventured to point out, with all due diffidence to such eminent scientists, that if I ran over one of them with a car, a doctor would have to adjust his inside, but that I who had disturbed it,—or rather my insurance company,—would have to compensate him for the disturbance. And that in precisely the same way, the compass with the perfectly good inside had to be compensated for disturbance, although no mechanical adjustment was made to it.

### A Correction.

Hereabouts, some poor innocent suggested that we might call it "correcting" the compass. This produced well-mannered howls of derision (we were a most sedate company), for even the scientists knew that a "compass correction" is a thing you do on a map, because the Magnetic North is not at the North Pole, and so at certain places when you are flying due North your needle may have to point due East or West, and at a certain spot in Canada, where the Magnetic Pole actually is, the needle tries to get out through the bottom of the aeroplane. Even in this country the Magnetic North is a good deal West of true North.

Forgive this, you lads who have just done a Navigation Course at Calshot and have heard of compass corrections for the first time. There are lots of new people just coming into Aviation who think that a compass worn on the right wrist to balance the wrist-watch on the left is all that is needed for a Mystery Flight to Australia.

And lots of you have never heard of that famous senior officer of the R.A.F., lately retired to our sorrow, whose compass could not be compensated in those early days when compasses sat on the floor just in front of or behind the control-stick, because he had so many plates in his legs, as the result of a crash caused by somebody else, that whenever he moved his rudder-bar the compass-card behaved like a roulette-wheel.

Anyhow, nobody suggested the word "regulation," which might have pleased everybody, and none of our practical and *ad hoc* arguments prevailed against the set ideas of the scientists on the misuse of the Latin Language. And I regret to say that the majority of the party agreed with them. Which only shows the psychological effect of having a reputation as a scientist.—C. G. G.

*(To be continued.)*

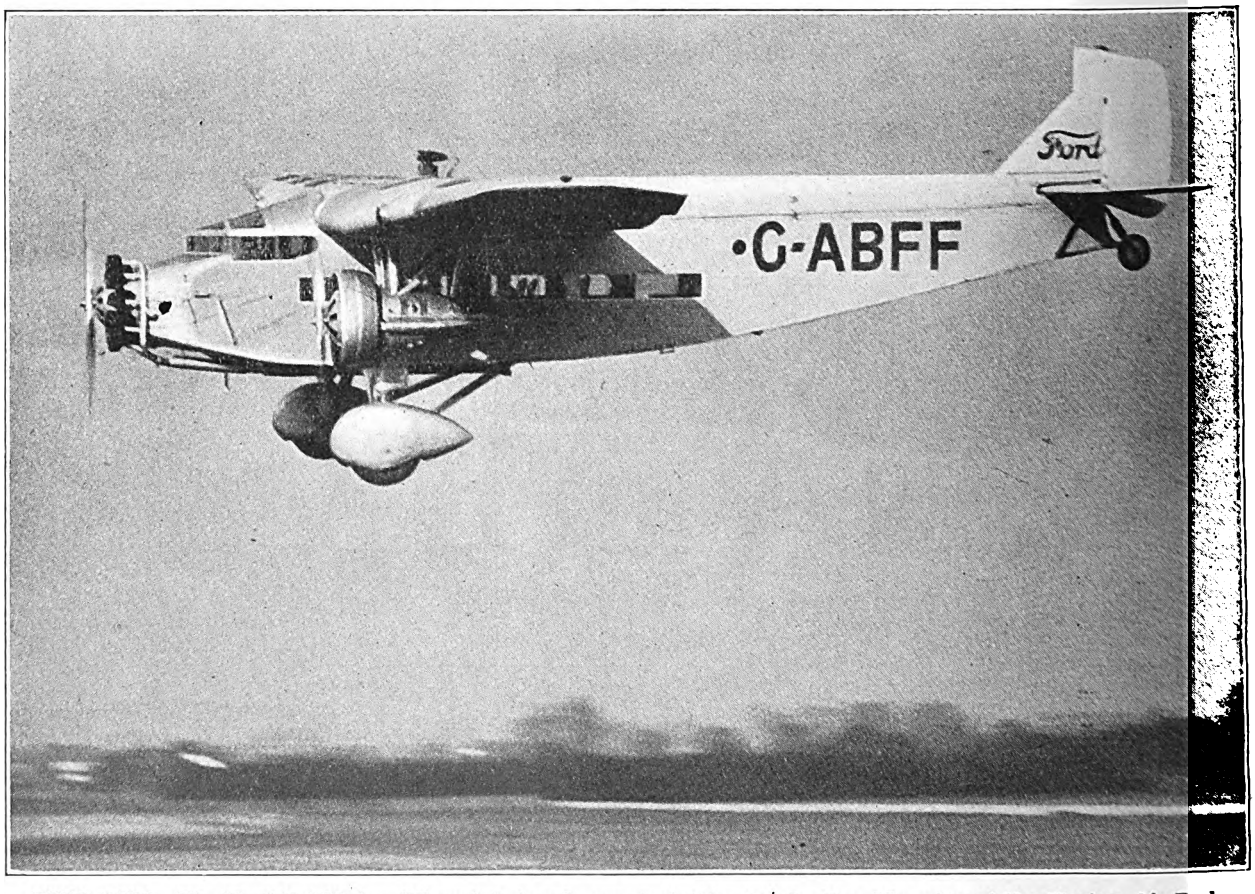
## TO GERMANY.

Those whose work takes them highest above the earth must necessarily have a fellow feeling for those whose work takes them deepest below it. During the War 1914-18, the flying people of all nations always felt the deepest sympathy for the poor devils in the trenches, and reciprocally those who considered themselves comparatively safe in the depth of a dugout were full of sympathy for the people whom they considered to be in imminent danger in the air.

Something of this same fellow-feeling must exist to-day among all aviators for those hundreds of men who died last week in those awful colliery explosions in Germany. All nations sent us messages of sympathy because something less than fifty of our people died in the airship R.101. Nearly six times as many Germans died last week in those coal mines, and the manner of the death of most of them was far more terrible than the deaths of those who died in the airship.

The cold horror of dying slowly, shut up in the dark, as has been shown by the pitiful diaries found with some of the bodies, is more agonising than the merciful suddenness of any form of death in a wrecked aeroplane or airship. Those men who work daily in coal mines become used to their danger, just as those whose duty or sport takes them into the air refuse to see any danger in their occupation. Therefore there is no great need to regard the dead miners as heroes any more than there is reason to regard the victims of the airship as heroes. But heroism of a very high order has been shown by those who worked to rescue the imprisoned miners, and heroic deeds were done by many of those who died, both among the rescue parties and among those already in the mine, in trying to save the lives of their fellows.

We of The Aeroplane feel sure that all the aeronautical community will wish to express their sympathy with the underground community of Germany in the tragedy which has fallen upon them.—C. G. G.




**FULL OUT.—The Ford Tri-Motor (Wasps) being demonstrated by Mr. Le Roy Manning at the Heston Air Park.**
*—("Aeroplane" photograph.)*

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# EDUCATING THE IMPERIAL CONFERENCE.

### Impressing Premiers and People.

Not for many a day has England's main air terminus seen so great a variety of aeroplanes, pacific and pugnacious, as it did on Oct. 25 when delegates to the Imperial Conference came to Croydon to see and be conquered.

When they arrived after noon—and Mr. Ramsay MacDonald's arrival from Chequers in a Fairey IIIF. was incidentally very punctual—the delegates visited the civilian array which was parked just south of the aerodrome buildings in truly civilian *negligé*.

On the whole the various types were quite smartly groomed for the occasion, and all had little official placards with their names, engines, power, loading, weight, range, and other intimate details more or less innaccurately set forth by a higher authority than the maker's. The sign-writing was very neat and of standard pattern, which is after all the main thing (as the delegates would hardly remember or understand the figures).

The types represented included an Argosy, which took assorted visitors for experience flights, a Westland IV (three Hermes) and its modern sister, the Wessex (three Genet Majors) demonstration model. The Vickers Vellore (two Jupiters) and the Vickers Viastra (two Jaguars) were among the most interesting models on display as they represent a modern calculated attempt to cater for commercial needs.

Of foreign commercial aircraft the twin-Jupiter Fokker of K.L.M., the three-Titan Fokker of *Sabena*, the Rohrbach Roland (three Junkers L5's) and a Golden Ray *Lioré et Olivier* (two Renaults) illustrated the variety of craft which use the airport in the way of daily business; and the landings to schedule of regular liners from abroad every hour or so showed the manner of their functioning.

A Cutty Sark (two Hermes) represented the Saro family.

The riches of the land in light aircraft were well and convincingly shown by the presence of Avians, Moths, Puss Moths, Spartans, Desoutters, Bluebirds, Redwings, a Marlet (Genet), and a Comper (Salmson). Several flying clubs had sent representatives and the manufacturers had well-groomed models there as official specimens.

Altogether it was a very representative show, and the great variety of thoroughly sound light aircraft was encouraging to us who knew of them individually before, and we can only hope that the Premiers, Potentates and Powers in the party were as impressed as they ought to have been.

The weather was anything but propitious, although a little sunshine alternated with the rain without being able to counteract the raw cold and a very rough wind. The hardihood of the delegates, especially those obviously from India, was very commendable, and they circulated among the machines in spite of the wet and discomfort, until blessed relief arrived in the form of lunch in the Aerodrome Hotel.—F. D. B.

### The Royal Air Force at Croydon.

The programme of Service flying on the occasion of the visit of Imperial Conference Delegates to the Air Port of London on Oct. 25, was timed to begin at 14.15 hours.

During the morning the Delegates visited the Service Machine Park and inspected the Units which were to take part in the display and also the representative types. The Prime Minister, Mr. J. Ramsay MacDonald, arrived at Croydon before lunch in a Fairey III.F. of No. 24 (Communication) Squadron. He had been fetched from the R.A.F. aerodrome at Halton, the nearest station for Chequers where he was staying. He returned in the same machine to Halton during the afternoon.

The machines in the Service machine park were:—

Armstrong Whitworth Siskin (365 h.p. Jaguar III A engine).

Gloster Gamecock (480 h.p. Jupiter VI engine).

Bristol Bulldog (480 h.p. Jupiter VII F engine).

Hawker Hornet (or Fury) Fleet Air Arm type (480 h.p. Rolls Royce F.XL S engine).

Hawker Hart (500 h.p. Rolls Royce F.XII A engine).

Armstrong Whitworth Atlas (385 h.p. Jaguar IV engine).

Vickers Virginia Mark X (two 530 h.p. Napier Lion XIa engines).

D.H. Moth (75 h.p. Cirrus engine).

Hawker Tomtit (130 h.p. Siddeley Mongoose engine).

Avro Tutor (130 h.p. Siddeley Mongoose engine).

Blackburn Ripon IIc (530 h.p. Napier Lion XIa engine).

Fairey III.F (Fleet Air Arm type) (530 h.p. Napier Lion XIa engine).

Westland Wapiti (460 h.p. Mark VIII. F Bristol Jupiter engine).

Handley Page Gugnunc (150 h.p. Siddeley Mongoose III engine).

Hill Pterodactyl (31 h.p. Bristol Cherub engine).

**RULERS AND JUDGES OVER US.—Mr. J. R. Clynes, Home Secretary, Lord Amulree, Secretary of State for Air, Mr. Ramsay MacDonald, Prime Minister, Mr. F. Montague, Under-Secretary of State for Air, and Mr. F. G. L. Bertram, C.B.E., Deputy Director of Civil Aviation, in front of a Westland Four (Hermes engines).**
—(*"Aeroplane" photograph.*)

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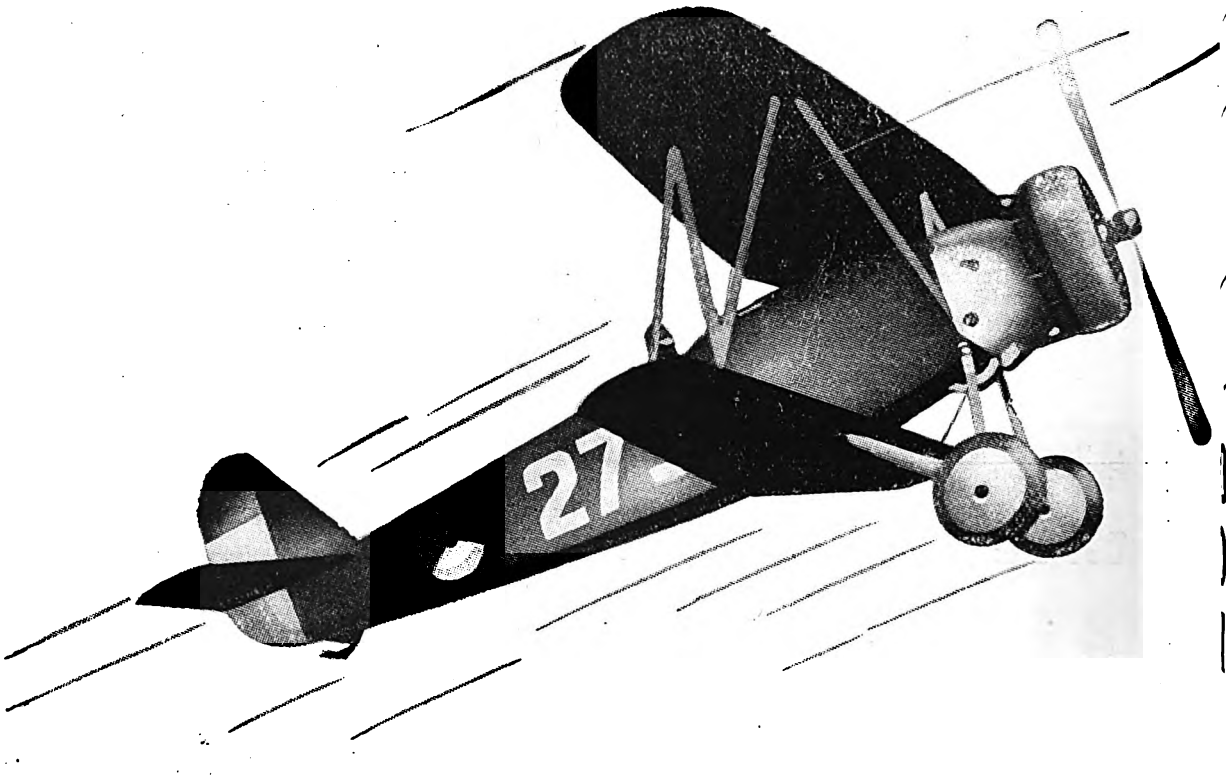
# FOKKER FAVOU
# RADIAL JA

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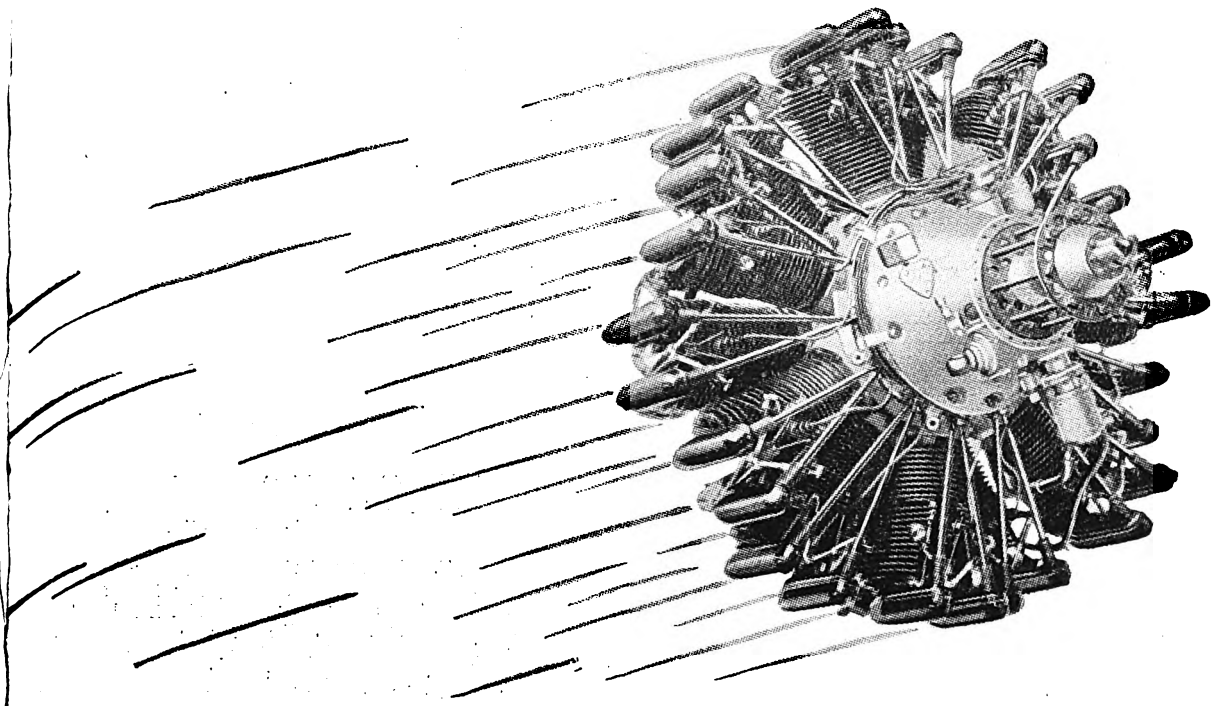

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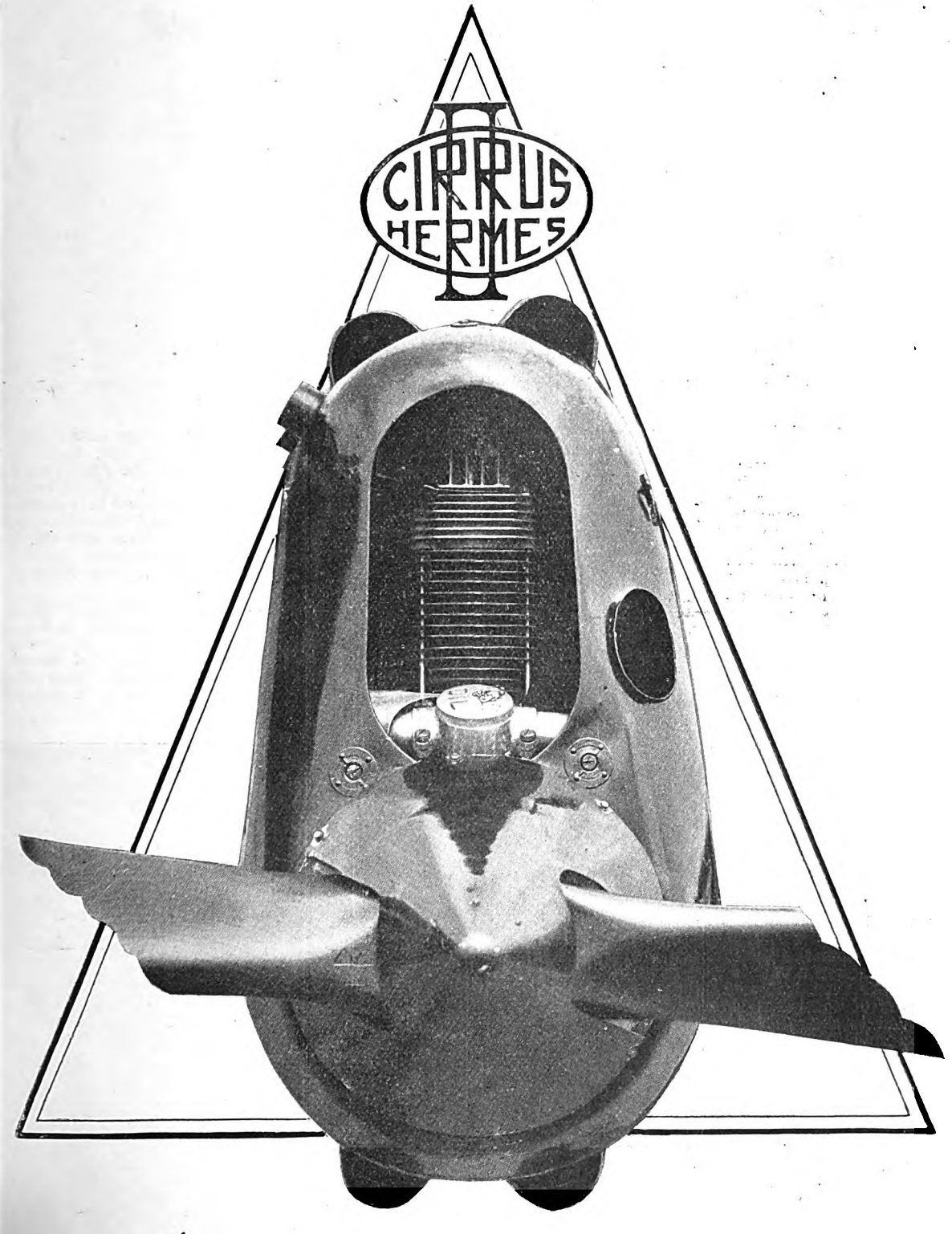


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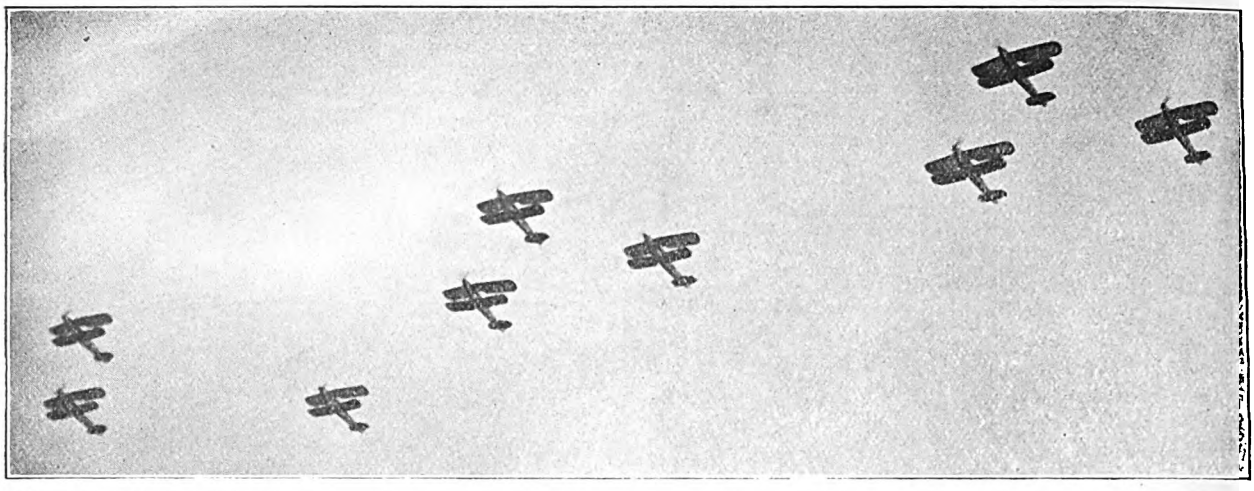

**SPEED AND RANGE.—Hawker Harts (Rolls-Royce FXII engine) of No. 33 (Bomber) Squadron, R.A.F., demonstrating formation flying at Croydon on Oct. 25.** —(*"Aeroplane" photograph.*)

As the Gamecocks landed, nine Hawker Harts (F XIa) of No. 33 (Bomber) Squadron took off in formation. As they reached the top of their climb and were about to turn one of the machines broke away from the formation and came back towards the aerodrome. It turned into the wind and landed alongside the spare machine which was still ticking over. The pilot changed into the spare machine and took off in hot pursuit of the Squadron which was at this time travelling east and at about 1,000 ft. By the time the Squadron had completed its first circuit the spare machine had overhauled it and, crossing in front of it on the turn, dropped into position in the formation.

Although the wind was still strong and gusty the clouds had cleared to some extent and the Squadron roared across the blue in perfect alignment. They changed formation on their western boundary and dived past the aerodrome sheds in flights-astern and climbed sharply into the wind at the end of the dive. They turned again in the same formation and landed by flights.

In the meantime the experimental aircraft, the Autogiro flown by Flt. Lt. C. E. Maitland, the Pterodactyl, flown by Flt. Lt. A. E. Rogenhagen, and the Gugnunc, flown by Flg. Off. H. H. Leech, had taxied into the middle of the aerodrome. They rose sedately into the air and, by falling into reasonably accurate formation, proved that Service discipline can triumph over Science. They gained height and turned into the wind and hung there at a fraction off stalling point while the announcer broadcast the information that they were "hovering." While this incredible exhibition was being staged an innocent Fokker arrived from Amsterdam in pursuit of its lawful occasions. When it had recovered from the shock it managed to land but is said to have registered a vow to take more water with it.

The announcer then informed us that a demonstration would be given of control at slow speeds. Each machine then proceeded to show how it could do the things that the others were intended to do. The Gugnunc tried to Autogiro, the Autogiro behaved like a Gugnunc, and the Pterodactyl gave an uncalled-for demonstration of crazy flying. Although their control in the air was remarkable they all three seemed to have some difficulty in finding the deck, in the same way that an elderly gentleman, having piloted himself home with some skill, fails dismally to find the keyhole.

No. 43 (Fighter) Squadron, unjustly known by the jealous members of rival Squadrons as "Mother Meyrick's Own," then gave its World-famous display of Squadron aerobatics (as performed before unnumbered crowned heads etc.). With their usual modesty the Americans have claimed to have first thought of stunting with groups of machines roped together, but if they did it first the R.A.F. do it best. Anyhow it is a very good idea because although it does not require any higher degree of Service training than many other stunts, it undoubtedly makes a fine spectacle. And a fine spectacle has uses beyond those which are obvious.

Rumour has it that after the R.A.F. Display last June the majority of those Cadets of the R.A.F. College who were about to pass out of Cranwell applied to be posted to No. 43 Squadron. This popular Squadron therefore got the two Cadets who passed out of the College with the highest qualifications.

If the display by No. 43 Squadron at Croydon had been inferior to that given by the Squadron earlier in the year knowledgable people would not have been surprised because, in addition to the bad weather, no Squadron is at the peak of its training at this time of year when a number of the personnel have been changed in the normal course of affairs. No. 43 Squadron is therefore all the more to be congratulated on a very fine show.

They took off by flights with the machines of each flight roped together and climbed out of the aerodrome. One machine, suffering apparently from slight engine trouble, broke away from its formation on the first turn but recovered and took up position again. They crossed the aerodrome in squadron formation, looped in formation and then changed into flights astern and then broke up into a huge Prince of Wales feathers. From this they quickly formed into squadron in line astern and followed each other down into a corkscrew dive, each machine half rolling on top of the corkscrew.

They crossed the aerodrome again in a switchback and then changed formation into flights abreast in line astern. In that formation they looped again.

They returned to squadron formation and looped twice in that formation without losing position. The formations were all amazingly tight and accurate in spite of the bumpy weather.—C. M. MCA.

**HIGH POLITICS.—Mr. Handley Page (Chairman of the Society of British Aircraft Constructors), and Mr. C. R. Fairey, President of the Royal Aeronautical Society, talking to Mr. Scullin, Prime Minister of the Commonwealth of Australia, and to Air Vice-Marshal C. L. Lambe, C.B., C.M.G., D.S.O., A.O.C. Coastal Area, R.A.F., at Croydon on Oct. 25.**—(*"Aeroplane" photograph.*)

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, October 21.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Lt. J. F. M. Robertson, R.N., is re-attached to the R.A.F. as a Flg. Off. with effect from Oct. 6 and with seniority of April 27, 1925.

The following Plt. Offs. on probation are confirmed in rank (Oct. 11):—C. P. F. Alderson, I. O. Baldwin, J. N. Baxter, B. W. E. R. Bonsey, M. Q. Candler, V. A. Dawson, F. P. R. Dunworth, N. Foster-Packer, H. M. Gahan, F. B. H. Hayward, N. D. Lamb, G. W. Lawson, E. G. Reed, J. F. Sutton, C. H. Williams.

Group Capt. R. H. Verney, O.B.E., is placed on the half-pay list, scale A (Sept. 18 to Oct. 8 inclusive) (substituted for the notification in the *Gazette* of Sept. 23); Flt. Lt. C. C. Edwards is placed on the half-pay list, scale B (Oct. 15, 1930, to Jan. 14, 1931, inclusive).

*October 24.*

GENERAL DUTIES BRANCH.—Lt. H. P. F. Fagan, Somerset Light Infantry, is granted a S.S. Comn. as Flg. Off. with effect from Sept. 27 and with seniority of July 15, 1927. The following are granted S.S. Comns. as Plt. Offs. on probation with effect from and with seniority of Oct. 10:—A. A. Adams, D. J. Bateman, J. A. B. Begg, G. R. Canavan, A. L. Christian, W. I. Clarke, A. E. Clouston, J. A. Dobson, J. N. Dufort, J. A. C. Forbes, E. Foster, W. M. Hargreaves, R. H. Harris, W. H. Husbands, N. A. Ireland, L. S. Lamb, L. T. McGinn, J. J. Murphy, L. J. Neale, F. R. Newell, H. L. Pendal, R. A. Phillips, H. Pilling, R. C. J. Rice, D. G. Singleton, F. G. L. Smith (Sec. Lt., 5th. Bn., Lincs. Regt., T.A.), J. G. Younghusband.

The following Flg. Offs. are granted Perm. Comns. in this rank (Oct. 1):—R. J. Legg, L. R. Stokes.

Mate W. G. Boaks, R.N., is granted a Temp. Comn. as a Flg. Off. on attachment for duty with the R.A.F. (Oct. 2).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—R. C. Dawkins, D. R. C. B. de Sarigny, T. W. Hodgson, B. J. Hurren, G. B. Keily, C. R. Lousada, J. S. D. Miles, C. V. Ogden, C. M. Rees, H. A. Shotter (Sept. 15); W. N. H. Banks, E. C. Burbin (Oct. 2).

Flg. Off. J. F. Lawn is transferred to the Reserve, Class A (Sept. 26); Plt. Off. on probation P. G. Harton resigns his S.S. Comn. (Oct. 10); Flg. Off. J. H. Harris relinquishes his S.S. Comn. on transfer to the Indian Army (Oct. 14).

The S.S. Comns. of the following Plt. Offs. on probation are terminated on cessation of duty:—J. C. L. Bruce (Oct. 10); T. N. Fraser (Oct. 15); J. A. M. Teacher (Oct. 15).

Flg. Off. B. A. C. Danbury is dismissed the Service by sentence of General Court Martial (Oct. 3).

MEDICAL BRANCH.—The following Flt. Lts. are granted perm. comns. in the ranks stated (Oct. 15):—G. M. Anderson, M.B., Ch.B., G. O. Williams, M.R.C.S., L.R.C.P.

The S.S. Comn. of Flg. Off. N. M. Jerram, M.R.C.S., L.R.C.P., is antedated to April 2, 1928. The following Flg. Offs. are promoted to the rank of Flt. Lt. (Oct. 3):—N. M. Jerram, M.R.C.S., L.R.C.P., G. O. Williams, M.R.C.S., L.R.C.P.

DENTAL BRANCH.—Flg. Off. B. L. Harrington, B.D.S., is promoted to the rank of Flt. Lt. (Aug. 27).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—G. A. G. Bowden (Sept. 18); J. G. G. Moore (Sept. 18); W. M. Russell (Sept. 21); H. C. S. Brand (Sept. 21); K. R. Warton (Sept. 21); T. F. Owen (Sept. 25); J. W. Bradley (Sept. 26); P. Johnson (Sept. 26).

The following Flg. Offs. relinquish their comns. on completion of service:—W. H. Whitlock (June 19); A. B. Roche (Aug. 31); H. E. Kirk, D.C.M. (Sept. 12); H. MacMillan (Sept. 27); B. J. Finn (Sept. 29); C. W. Carter (Oct. 6).

Flt. Lt. F. R. P. Dexter relinquishes his comn. on completion of service and is permitted to retain his rank (Sept. 16); Flg. Off. H. W. Nicholl relinquishes his comn. on completion of service (Sept. 12).

STORES BRANCH.—Flg. Off. E. W. Husband relinquishes his comn. on completion of service and is permitted to retain his rank (Sept. 12).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON.—The following to be Plt. Off.: J. Cherry (Aug. 19).

No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—The following to be Plt. Off.: I. W. H. Thomson (Aug. 29).

ACCOUNTANT BRANCH.—No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—The following to be Plt. Off.: J. O. Buchanan (Oct. 1).

MEDICAL BRANCH.—No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—The following to be Flg. Off.: J. E. Howell, M.B., Ch.B. (July 9).

## Appointments.

*Week ending October 27.*

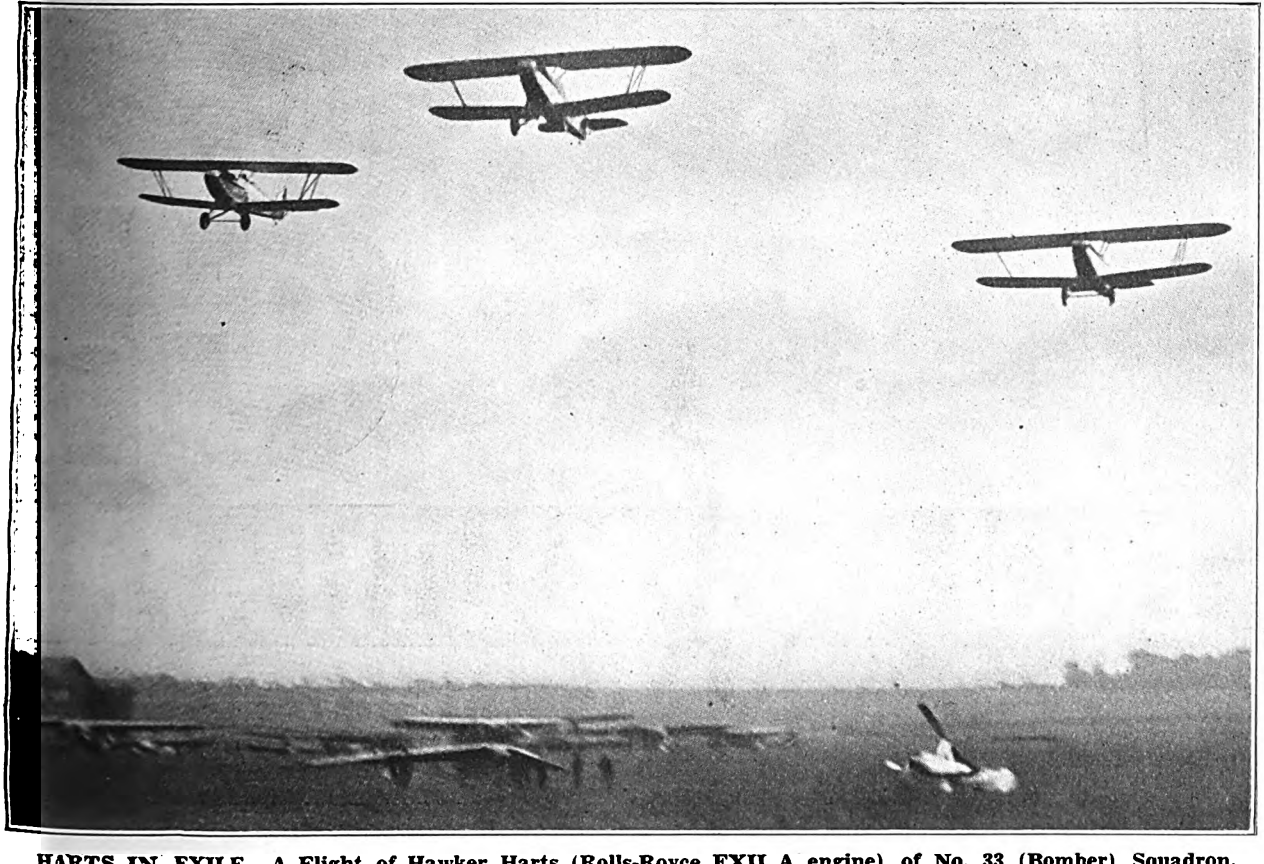
GENERAL DUTIES BRANCH.—Air Commodore W. R. Freeman, D.S.O., M.C., to H.Q., 'Iraq Command, for duty as C.S.O., 9/10.

Group Captain R. H. Verney, O.B.E., to R.A.F. Depot, Uxbridge, whilst attending Senior Officers' War Course at R.N. College, Greenwich, 13/10.

Wing Commander A. R. Arnold, D.S.C., D.F.C., to H.M.S. *Glorious*, pending appointment as Senior Air Force Officer, 11/10.

Squadron Leader P. C. Wood, to R.A.F. Base, Kai-Tak, Hong Kong, 14/10.

Flight Lieutenants G. S. N. Johnston, to No. 503 Sqdn., Lincoln, 20/10. W. Wynter-Morgan, M.C., to A. and G. School, Eastchurch, 17/10. G. A. Hadley, to No. 445 Flight, 6/10. C. E. N. Guest, to Air Ministry (D.O.I.), 20/10. R. E. Meek, to No. 22 Group H.Q., S. Farnborough, 8/9. J. MacG. Fairweather, D.F.C., to No. 17 Sqdn., Upavon, 9/10. C. C. Edwards, to Half-pay List, 15/10. F. G. Cator, to H.Q., R.A.F., Middle East, 7/10. H. A. J. Wilson, O.B.E., to Station H.Q., Mount Batten, 14/10. M. S. Keogh, A.M., to H.A.D., Henlow, 13/10.



**HARTS IN EXILE.—A Flight of Hawker Harts (Rolls-Royce FXII A engine) of No. 33 (Bomber) Squadron, R.A.F., over an assortment of aircraft at the Air Port of London on Oct. 25.** —(*"Aeroplane" photograph.*)

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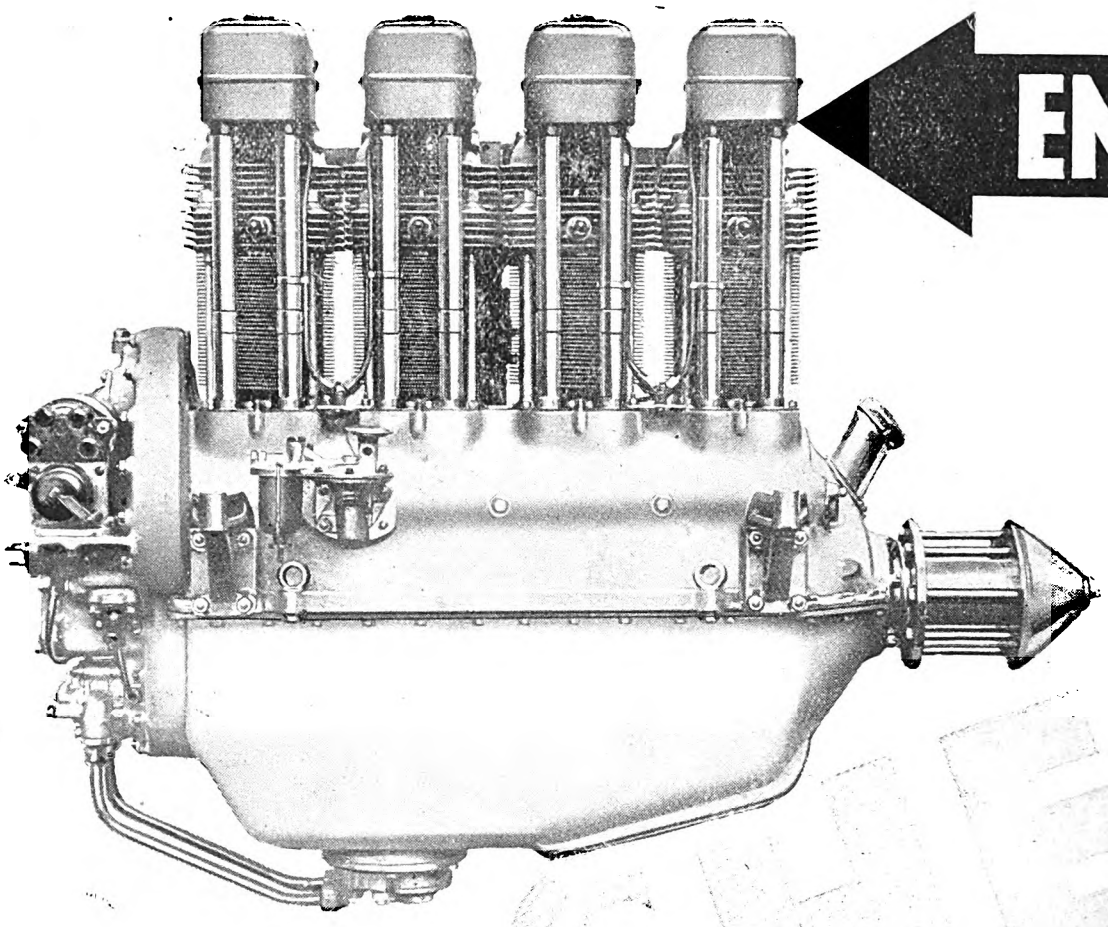

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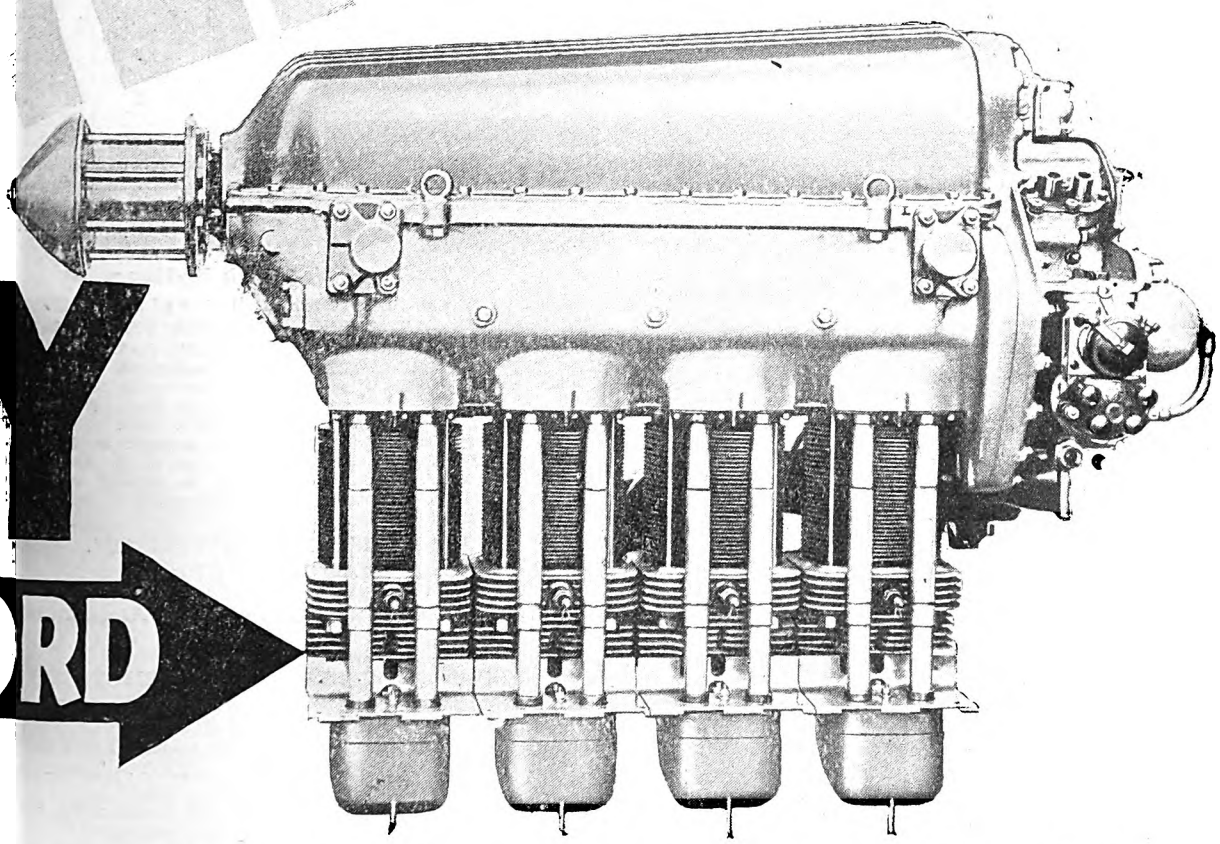

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Flying Officers P. F. Luxton, to No. 10 Sqdn., Upper Heyford, 15/10. W. S. C. Adams, to No. 19 Sqdn., Duxford, 13/10. I. G. E. Dale, to R.A.F. Depot, Abukir, 22/9. L. C. Phillips, to R.A.F. Depot, Uxbridge, 13/9. L. M. Woolveridge, to No. 4 F.T.S., Abu-Sueir, 23/9. G. F. Hales, to A. and G. School, Eastchurch, 8/10. J. N. Jaques, to No. 4 Sqdn., S. Farnborough, 8/10. F. C. Tracey, to No. 5 F.T.S., Sealand, on appointment to a Temp. Comn., 27/9. C. E. V. L'E. Feasey, to No. 24 Sqdn., Northolt, 18/10. W. T. Walton, to No. 7 Sqdn., Worthy Down, 16/10. E. L. J. Rowe, to No. 13 Sqdn., Netheravon, 21/10. D. Menzies, to No. 4 F.T.S., Abu-Sueir, 2/10.

Pilot Officers L. Crocker, to No. 205 Sqdn., Singapore, 14/10. J. Grierson, to No. 11 Sqdn., India, 3/10. W. G. Eatherley and C. B. Smith, to R.A.F. Depot, Uxbridge, 28/9. W. F. Pharazyn, to No. 17 Sqdn., Upavon, 11/10. C. P. F. Alderson and G. W. Lawson, to No. 9 Sqdn., Manston, 8/10. I. O. Baldwin and N. D. Lamb, to No. 10 Sqdn., Upper Heyford, 8/10. F. B. H. Hayward and P. A. Smith, to No. 12 Sqdn., Andover, 8/10. C. E. G. Adye, to No. 17 Sqdn., Upavon, 8/10. B. W. E. R. Bonsey, to No. 19 Sqdn., Duxford, 8/10. F. P. R. Dunworth, to No. 25 Sqdn., Hawkinge, 8/10. N. Foster-Packer and W. J. Scott, to No. 35 Sqdn., Bircham Newton, 8/10. E. Dawson and C. H. Williams, to No. 43 Sqdn., Tangmere, 8/10. L. E. P. Mahon, to No. 54 Sqdn., Hornchurch, 8/10. M. V. Johnstone, to No. 56 Sqdn., North Weald, 8/10. J. F. Sutton, to No. 99 Sqdn., Upper Heyford, 8/10. D. Carr and E. G. Reed, to No. 101 Sqdn., Andover, 8/10. J. N. Baxter, to No. 111 Sqdn., Hornchurch, 8/10. V. A. Dawson, H. M. Gahan and N. Hill, to No. 207 Sqdn., Bircham Newton, 8/10. The undermentioned are all posted to R.A.F. Depot, Uxbridge, on appointment to S.S. Comns., with effect from 10/10:—A. A. Adams, D. J. Bateman, J. A. B. Begg, G. R. Canavan, A. P. Christian, W. I. Clarke, A. E. Clouston, J. A. Dobson, J. N. Dufort, J. A. C. Forbes, E. Foster, W. M. Hargreaves, R. H. Harris, W. H. Husbands, N. A. Ireland, L. S. Lamb, L. T. McGinn, J. J. Murphy, L. J. Neale, F. R. Newell, H. L. Pendal, R. A. Phillips, H. Pilling, R. C. J. Rice, D. G. Singleton, F. G. L. Smith, J. G. Younghusband.

Medical Branch.—Squadron Leader T. J. Thomas, to H.Q., R.A.F., Middle East, 11/10.

Flight Lieutenant L. C. Palmer-Jones, to Princess Mary's R.A.F. Hospital, Halton, 2/11.

Flying Officers J. Murphy, to R.A.F. Depot, Uxbridge, 27/10. M. Pearson, to No. 1 School of T.T. (Apprentices), Halton, 1/10. A. H. Barzilay and J. F. S. Wiseman, to H.Q., Aden Command, 7/10. J. Holt (Quartermaster), to R.A.F. Hospital, Aden, 7/10.

Stores Branch.—Squadron Leader T. G. Skeats, to R.A.F. Base, Singapore, 14/10.

Flying Officers J. E. R. Sowman, to No. 33 Sqdn., Eastchurch, 28/10. E. H. Walker, to No. 47 Sqdn., Khartum, 26/9. N. W. Law, to Station H.Q., Bircham Newton, 17/10.

Accountant Branch.—Flight Lieutenant F. O. Hall, to School of Naval Co-operation, Lee-on-Solent, 10/10.

Dental Branch.—Flight Lieutenant J. M. Jamie, to H.Q., 'Iraq Command, 7/10.

### The Kurdistan Frontier.

The following paragraph is taken from *The Times* of Oct. 25:—

Trouble is believed to have broken out in the Suleimania district of 'Iraqi Kurdistan. The 'Iraqi Arab troops have been moved up and it is reported that they will be assisted by the Royal Air Force and also by the Levies, who are mostly Assyrian Christians. Feeling among the Christian population is understood to be hostile to the expedition on the ground that a conflict with the Kurds might have been avoided, and that in the event of fighting the Christian population and troops are likely to suffer more than the Arabs.

### Attachment of 'Iraqi Officers to R.A.F. Units.

The following 'Iraqi officers are attached to R.A.F. Units on the dates given:—

Mulazim Thani (Lieutenant) Sami bin Abdul Fattah to No. 5 F.T.S. on 30/9/30.

Mulazim Thani Muhammed bin Yasin to No. 5 F.T.S. on 30/9/30.

Mulazim Thani Naji bin Ibrahim to No. 5 F.T.S. on 30/9/30.

Mulazim Thani Bahjat bin Rauf to No. 3 F.T.S. on 28/10/30.

Mulazim Thani Irmiyah bin Nasir to No. 3 F.T.S. on 28/10/30.

### Air Telegraphists.

A distinguishing badge is to be introduced for Telegraphist Air Gunners in the Fleet Air Arm. Ratings who qualify as telegraphists air gunners serve for a period of 2½ years in the Fleet Air Arm and then revert to general service in the Fleet.

### R.A.F. College Rugby Football.

The Rugby Football match between the R.A.F. College, Cranwell, and the R.M.C., Sandhurst, will be played at Cranwell on November 8 and the match between the R.A.F. College and the R.M.A., Woolwich, will be played at Woolwich on November 15.

All Old Cranwellians should make a point of turning up at one or both of these matches to support their team.

### Association Football.

The R.A.F., playing their first representative game of the season, beat Oxford University at Woking on Oct. 25 by four goals to nil. Oxford played well in the first half, but deteriorated rapidly in the second half.

The R.A.F. played excellent football throughout and fully deserved to win. The R.A.F. team were:—

AC. Merwood (Uxbridge), goal; Sjt. James (Eastchurch) and Cpl. Pond (Henlow), backs; L-AC. Hamlett (Halton), Cpl. Baldwin (West Drayton), and AC. Bulmer (Lee), half-backs; AC. Vigers (Kenley), Sjt. Sadler (Coastal Area), L-AC. Vernon (Halton), AC. Hill and AC. Hickey (Uxbridge), forwards.

### A Memorial.

A Memorial to the late Flt. Lt. N. H. Jenkins, O.B.E., D.F.C., D.S.M., who was killed in December 1929 in an attempt to fly non-stop from England to the Cape with Sq. Ldr. Jones Willams, M.C., has been presented to the Mess of No. 84 (Bomber) Squadron, R.A.F., by some of those who served with Flt. Lt. Jenkins in that Squadron. The design is in silver, with the following inscription on the base:—

Presented to the Officers' Mess, No. 84 (B) Squadron, in memory of Flight Lieutenant H. N. Jenkins, O.B.E., D.F.C., D.S.M., by the officers who served with him in the Squadron and by those who were serving in the Squadron at the time of his death.

In September, 1929, Flight Lieutenant Jenkins with Squadron Leader Jones Willams, M.C., made the first non-stop flight from England to India in a Fairey monoplane. In the following December whilst attempting to fly non-stop from England to Cape Town in the same aeroplane, both officers lost their lives in the mountains of North Africa.

### The C.F.S. Re-Union.

Air Commodore N. D. K. MacEwen, C.M.G., D.S.O., will take the Chair at the re-union dinner of past and present members of the Staff of the Central Flying School, which will be held at Jules' Restaurant, Jermyn Street, W.1, on Nov. 14.

Those intending to be present should communicate, without delay, with Flt. Lt. C. Clarkson, 27, Holland Street, Kensington, W.8.

### The Great Yarmouth Re-Union.

The eleventh annual re-union dinner of those officers who served at Great Yarmouth Air Station between the years 1913 and 1920 was held at the Café Royal on Oct. 25. Among the large number of officers who attended were:—

Rear-Admiral A. A. Ellison, Air Commodore C. R. Samson, Air Commodore F. W. Bowhill, Group Captain C. L. Courtney, Wing Cdr. Robert Leckie, Sq. Ldr. A. S. Maskell, Flt. Lt. S. D. Culley, Major Egbert Cadbury, Captain G. W. R. Fane, Captain S. J. Fetherston, and Messrs. H. C. Armitt, B. E. Barwell, G. F. H. Harrison-Bloom, E. A. Bolton, C. F. Snowden Gamble, A. E. Hartley, John Hodson, A. C. Holman, F. G. S. Musson, W. P. Parkhouse, A. E. Siddons-Wilson, and R. N. Walter.

### AIR MINISTRY APPOINTMENTS.

Lord Amulree, Secretary of State for Air, has appointed Mr. L. G. S. Reynolds to be his Principal Private Secretary and Mr. I. V. H. Campbell to be his Assistant Private Secretary.

### ORDERS FOR BRITISH AERO-ENGINES.

Notwithstanding keen competition from other engine firms in all parts of the World, the Greek Government have just placed an order with D. Napier and Son Ltd. for a number of British-built Napier Lion engines. These engines are to be installed in Fairey IIIF biplanes.

The Imperial Japanese Government have also placed a further order for Napier Lion engines, which will be fitted to aeroplanes built in Japan.

It is particularly gratifying to find the Napier engine upholding British prestige abroad and to see that, despite the keenness of other countries, preference is given to British engines.

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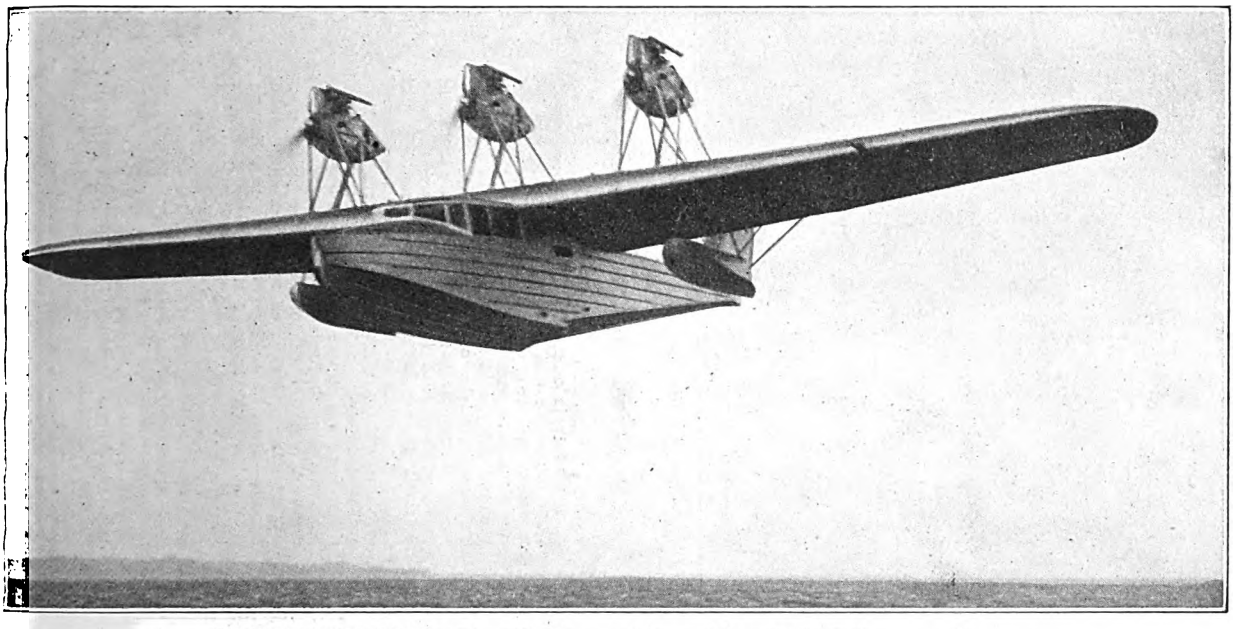
## THE SARO WINDHOVER.



**IN HER ELEMENT.—The Windhover (three Gipsy IIs) flying near Cowes.**

On Oct. 16 Saunders-Roe Ltd. launched from their East Cowes works the Saro Windhover, a light three-engined, six-passenger cabin flying-boat and the third of a series of flying-boats of similar characteristics which the company laid down some time ago. The first of the series, the Cutty Sark four-seat cabin flying-boat amphibian, has been in production since 1929, and is fairly well known all over this country. The Windhover is the second of the series in point of size and power and as mentioned above has just been launched. The third of the series is the Cloud, a twin-engined eight-ten-seat cabin flying-boat amphibian which was launched some months ago. The general design of these three aircraft, which are shown together in one of the accompanying illustrations, is similar and they vary only in the disposition and power of the engine installation and in the lay-out of the passenger accommodation.

The Windhover was tested on Oct. 16 and 17 and five days later it was flown to Felixstowe by Flt. Lt. Scott, the Saunders-Roe test pilot, for its official Air Ministry trials.

This machine will, when its tests are complete, be delivered to Dominion Airways Ltd., of New Zealand, and to facilitate packing to this distant Dominion the wing of this particular model has been made in three sections.

The Windhover is fitted with three 105 h.p. D.H. Gipsy II four-cylinder in-line air-cooled engines, but as with the other two machines in the series, allowances are made for the installation of any one, two, or three engines of, in the case of the Windhover, approximately 300-350 total h.p.

### Description.

Type.—Three-engined, six-seat cabin flying-boat.

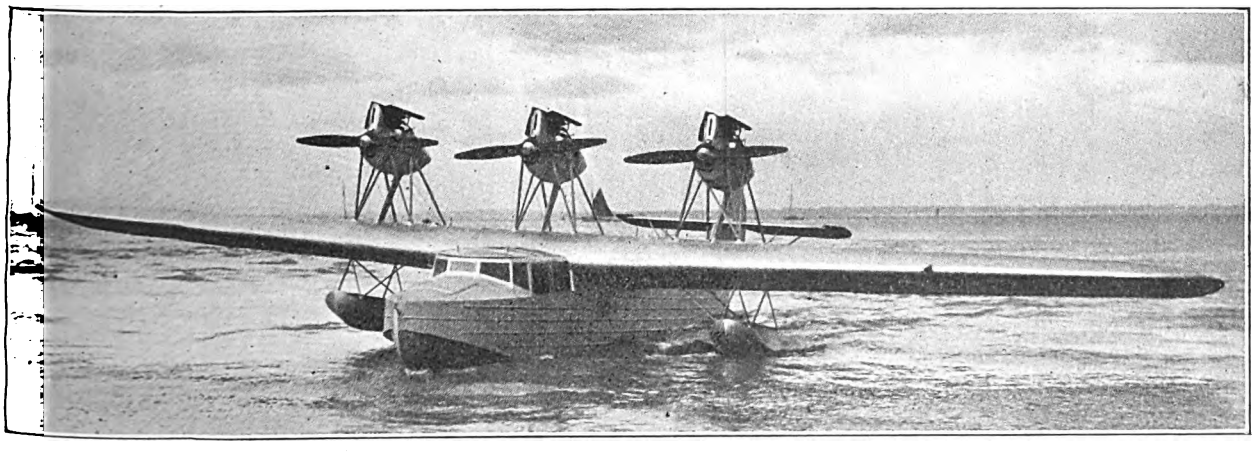
Wing.—Full cantilever monoplane built of wood and covered with plywood. The spars are of the box type with spruce flanges and three-ply webs. The ribs are built up of plywood. The top surface of the middle portion of the wing in the region of the engines is specially strengthened to permit walking on. Narrow chord ailerons insert from the wing-tips. The wing which is normally made in one piece is, in the case of the first Windhover, made in three sections to facilitate dismantling and packing.

Hull.—Single-step, Vee-bottomed structure of Alclad, a protected duralumin which is very resistant to corrosion. The hull is built up of straight sections and the framework is covered with Alclad sheet in flat sections which are easy to repair or replace in the event of damage as no panel beating is required throughout the structure.

Tail Unit.—Normal monoplane type. The fin is built integral with the hull and is of Alclad construction. The tail-plane, elevators and rudder are of welded steel tube construction and are covered with fabric. The rudder and elevators are balanced. The elevators are operated by a torque shaft through the fin and by cables through the hull. The rudder is operated by cables direct from the rudder bar. The tail-plane is adjustable in the air by a screw jack which is actuated by cables from a hand-wheel situated at the side of the pilot.

Undercarriage.—Terminal fittings are fitted on the machine so that an amphibian undercarriage may be supplied if desired. The main compression legs incorporate combined oleo and rubber-in-compression springing. Their bottom ends are hinged to the sides of the hull by half axles and radius rods. The points of attachment to the hull are above the water line so as not to interfere with the clean running of the hull. When fully retracted, the wheels are clear of the water for taking off. For beaching the flying-boat a special chassis is provided. This consists of a tube built into the hull through which an axle with detachable wheels is passed.

Power-Plant.—Three 105 h.p. D.H. Gipsy II four-cylinder, in-line air-cooled engines mounted in nacelles above the wing and driving tractor airscrews. The three main fuel tanks of 26 gallons capacity each are mounted in the wing with a balance pipe connection. Each engine is fitted with a fuel pump which supplies direct to the carburetter. Cross connections are arranged so that any two engines may be run on any one pump. Three Cirrus-Hermes engines may be fitted in place of the Gipsy II engines.



**AT REST.—The Windhover moored against the tide at Cowes.**

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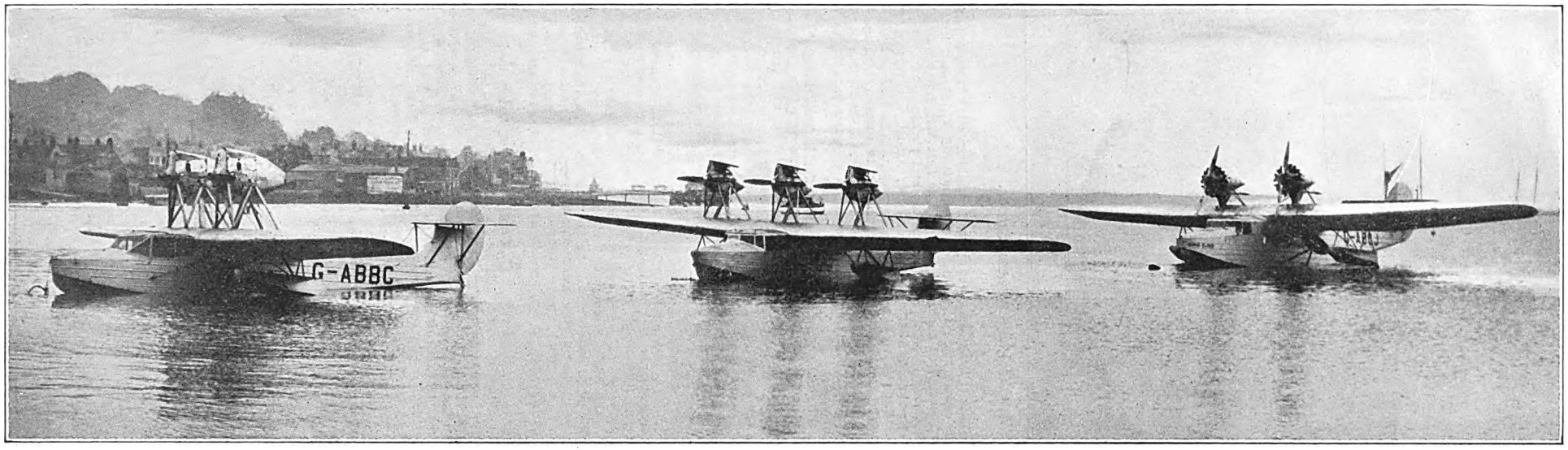


**THE SARO FLEET.—Left to right,—The Cutty Sark (two 115 h.p. Hermes), the Windhover (three 105 h.p. Gipsy IIs), and the Cloud (two 300 h.p. Whirlwinds).**

## THE R.101 INQUIRY.

An independent Court of Inquiry into the cause of the disaster to R.101 was opened at 10.00 hours on Oct. 28. Sir John Simon, K.C., recently president of the Indian Statutory Commission; Lieut.-Col. J. T. C. Moore-Brabazon, incidentally is the holder of the Royal Aero Club's pilot's certificate No. 1; and Professor E. C. Inglis, of the Department of Mechanism and Applied Mechanics, Cambridge, are the members of the Court. The inquiry will be public.

Dr. Hugo Eckener, President of the Zeppelin Company and commander of the *Graf Zeppelin*, has offered to help in any way which his experience makes possible.

The Court of Inquiry on the accident to the R.101 is being held in the great hall of the Institution of Civil Engineers, Great George Street, Westminster, as the King's Bench Court, No. 5, of the Royal Courts of Justice has been found too small to accommodate the expected attendance.

An official statement has been made that Sir John Simon will accept no fee for his services.

## HELIUM FOR AIRSHIPS.

The following note is taken from *The Times*:—

During the War Mr. Alexander Duckham investigated the possibilities of obtaining helium gas from the Island of Trinidad, and was successful in obtaining 2 per cent. of helium from the natural gas. This compares very favourably indeed with the United States, seeing that the State gas field at Petrolia contains not more than 1.75 per cent. So far as I am aware, the highest percentage of helium found in natural gas in the United States is 3.60. The vital importance of having our own supply of helium gas cannot be too strongly emphasised, and if it be possible to obtain it from the Island of Trinidad there should be no delay in the matter.—Mr. E. T. Brown, Burwood Farm, Rotherfield, Sussex.

## HELIUM SUPPLIES.

Our valued correspondent in Chicago, writing on Oct. 8,—just about when the article pointing out the possibility of getting helium in Canada was being printed in this paper, of that date—says:—

I seem to recall, by the way, that you have a potential helium field in Canada. Northwest of Winnipeg, stretching along the westward side of Lakes Manitoba and Winnipegosis there is an extensive oil shale and pool oil deposit, and I rather think I was told some two or three years ago that there was more than a trace of helium in the by-product gas of the few test bores.

I haven't maps or reports available on the oil districts farther west, a northern continuation of our own Montana fields. But the presence of helium on this side of the border would seem to indicate it should be found above the line.

The new extraction process which the Army has developed makes helium recovery from low grade gases profitable at a low price for the gas. I don't believe we are actually using this process, as the new Amarillo, Texas, extraction depot is working in the richest field yet found, and so doesn't need the newer method.

Did you ever know that our original helium discovery was made some twenty years ago in Kansas when a natural gas company organised to supply light and heat to one of the small towns was much embarrassed to find its gas supply would blow out a match, instead of burning?

[Most people, including probably our own airship people, are ignorant of the fact that there is such a thing as a cheap method of extracting helium. This may make our Canadian helium a business proposition.—C. G. G.]

*(Continued from previous page.)*

Accommodation.—In the bow is a compartment for the stowage of warps, anchor and other marine gear. Aft of this, and in front of the wing, is a cabin with seating accommodation for four. Under the wing and between the spar frames is further accommodation for two passengers. The whole of the front, sides and roof of the forward cabin are provided with windows. Large windows are provided in the hull sides for the aft passengers. For access to the cabin the starboard sliding window and a sliding section of the roof of the forward cabin give an easy entrance. The pilot is normally seated in the port side front seat but the other seat may be provided with a control if desired. Control is by wheel and parallel-motion rudder-bar which is quickly adjustable for leg reach. The engine controls are situated between the two front seats within easy reach of either occupant. There is a passageway between the seats in the forward cabin, the floor of which is lower than that under the seats. A hinged roof panel over the pilot's seat gives sufficient space for the pilot to stand up to pick up moorings.

Dimensions.—Span 54 ft. 3.6 ins. (16.55 m.), Length 41 ft. 3.6 ins. (12.6 m.), Height 12 ft. 3 ins. (3.74 m.), Wing area 450 sq. ft. (41.8 sq. m.).

Weights and Loadings (flying-boat).—Weight empty 3,590 lbs. (1,630 kgs.), Pay load 945 lbs. (428 kgs.), Pilot 170 lbs. (77 kgs.), Fuel and oil (4 hours) 645 lbs. (292 kgs.), Weight loaded 5,350 lbs. (2,425 kgs.), Wing loading 11.9 lbs./sq. ft. (58 kgs./sq. m.), Power loading 17 lbs./h.p. (8.1 kgs./h.p.).

Weights and Loadings (amphibian).—Weight empty 3,790 lbs. (1,720 kgs.), Pay load 745 lbs. (338 kgs.) All other weights as for flying-boat.

Performance (flying-boat).—Speed, max. 110 m.p.h. (177 km.p.h.), Cruising speed 97 m.p.h. (156 km.p.h.), Landing speed 53 m.p.h. (85 km.p.h.).

Performance (amphibian).—Speed, max. 105 m.p.h. (169 km.p.h.), Cruising speed 92 m.p.h. (148 km.p.h.), Landing speed 53 m.p.h. (85 km.p.h.).

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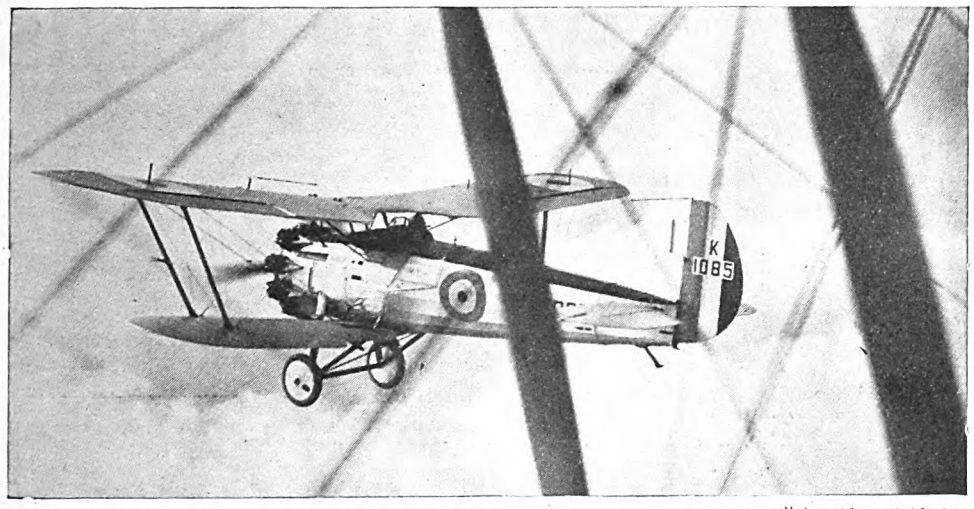
# "Bristol"




"Aeroplane" photo.

The merits of the "Bristol" Bulldog All-Steel Single-Seater Fighter are best appreciated by squadrons of the Royal Air Force, the Royal Australian Air Force and the Air Forces of Latvia, Esthonia and other countries which are equipped with Bulldog machines.

THE BRISTOL AEROPLANE CO., LTD.
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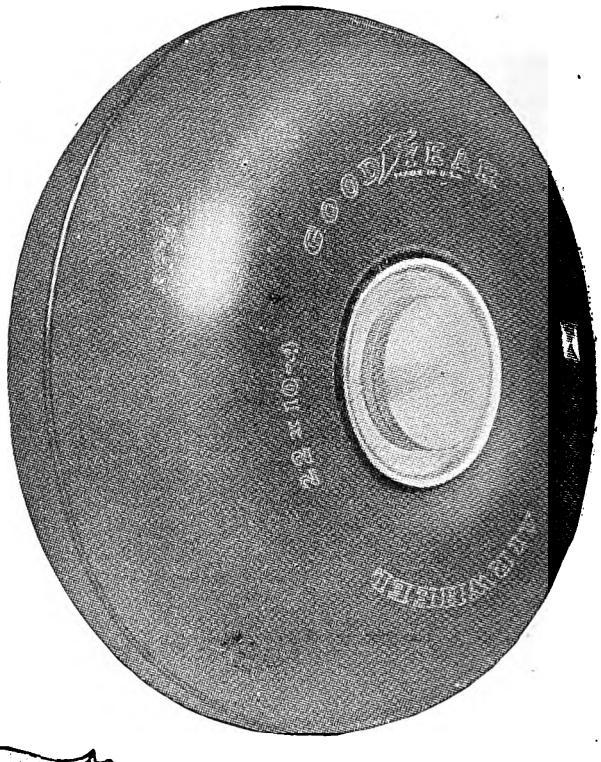

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

# STRUCTURAL STRENGTH REQUIREMENTS FOR CIVIL AIRCRAFT IN GREAT BRITAIN AND THE U.S.A.

BY H. A. METTAM, M.A., A.F.R.AE.S.

The task of comparing the Airworthiness Requirements of two countries is one of considerable complexity, but fortunately the comparison between Great Britain and the United States of America is made easier by the fundamental similarity in method and outlook of the Airworthiness Authorities in the two countries. There are important detail differences between the British and American regulations, but there do not appear to be any differences in principle. The real worth of any Airworthiness system depends not only on the letter of its laws but on the spirit in which those laws are interpreted by the Department responsible for enforcing them.

The British Airworthiness Department is always striving to improve its regulations by alterations, additions or deletions as experience shows these to be desirable, and the technical officers of the Department are always willing to give careful consideration to suggestions put before them for dealing with new problems, or for amending the existing methods. With regard to the British Department, the writer can speak from many years' knowledge of its methods and men, but in the case of America he is compelled to judge from printed regulations only. It appears from these, however, that the corresponding American Authority also is alive to the tentative nature of many of its rulings, and is open to consider suggestions from the designers and constructors.

The Editor has allocated to the present article the question of Structural Strength Requirements, but it must not be forgotten that the Airworthiness of aircraft depends also on their flying qualities, workmanship and inspection of materials and construction, the satisfactory functioning of the engines, airscrews, and instruments, and the skill and experience of the pilots which are to a certain extent under the control of the licensing authority.

### HANDBOOKS AND REGULATIONS.

The two British publications, to which frequent reference will be made in these notes are both issued by the Airworthiness Department of the Air Ministry. Air Publication No. 970, *Handbook of Strength Calculations* (hereinafter called A.P. 970), covers the methods of calculating the loads imposed upon the various members of an aircraft structure and also shows how to determine the strength of those members. This publication and its Appendices deal in great detail with aerodynamic and other assumptions to be made and with the mathematical aspects of the stress analysis, including many special cases which are not amenable to the methods of calculation to be found in ordinary books on Theory of Structure

Air Publication No. 1208, *Airworthiness Handbook for Civil Aircraft* (hereinafter called A.P. 1208), covers the differences in the strength requirements for civil, as compared with military, aircraft, but is mainly concerned with installation and inspection requirements. In addition to these two books, there are numerous instructions issued by various departments of the Air Ministry, including the Aeronautical Inspection Directorate (more familiarly known as the A.I.D.) and the Airworthiness Department itself, which aim at preventing "bad practice" in either design or construction.

The American publication on which these notes are based is the Aeronautics Bulletin No. 7A, *Airworthiness Requirements of Air Commerce Regulations*, issued by the Department of Commerce, Aeronautics Branch. This is an amazingly comprehensive little book, which covers, on the structural side alone, the Load Factors required, aerodynamic assumptions to be made, formulæ for strengths of members and permissible stresses, empirical correction factors of many kinds, and rules for the design of fittings, and other detail parts. In addition to all this it covers installation requirements, and requirements for approval of performance data. Somewhat naturally, however, reference must be made to other papers for the details of mathematical and aerodynamical calculations which form so valuable a part of the Appendices of A.P. 970.

### RELATION BETWEEN LOAD FACTORS AND SAFETY.

It is most important to realise that the mere comparison of two tables of the Load Factors required does not give a

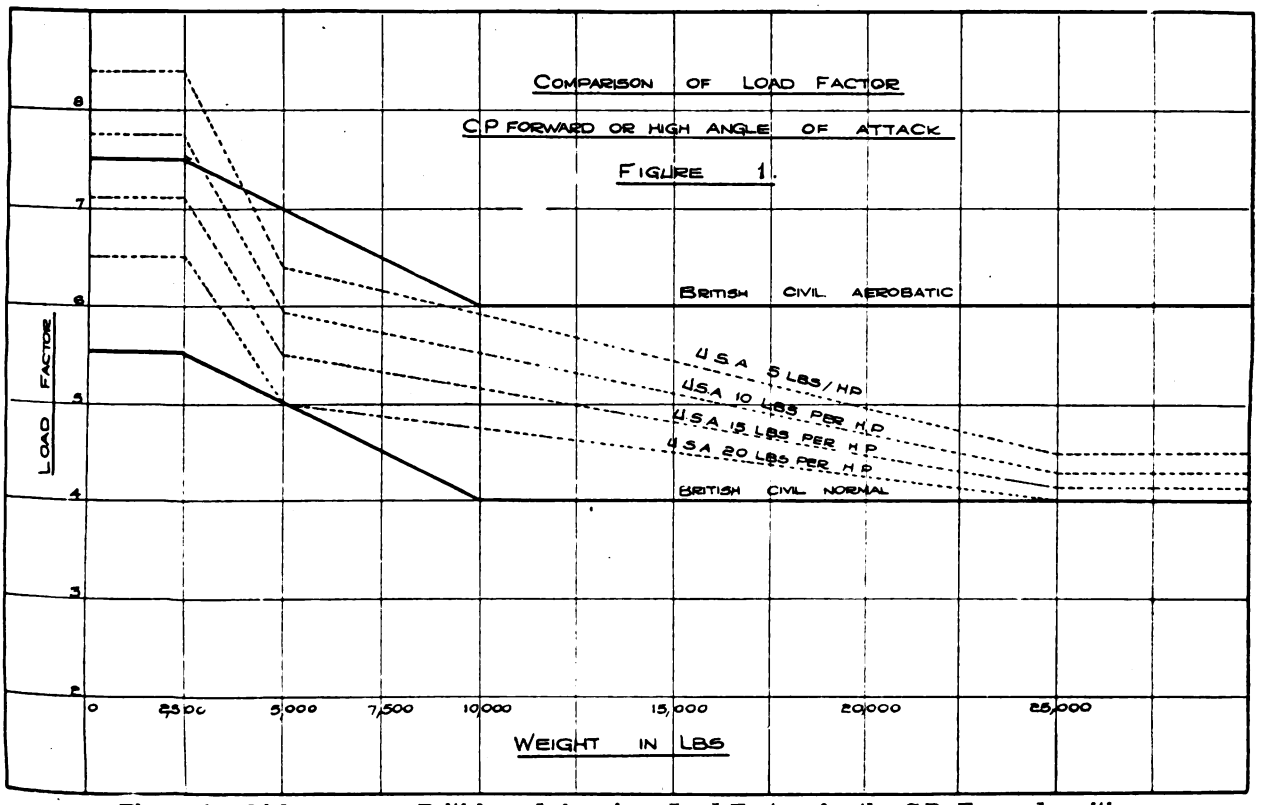


**Figure 1, which compares British and American Load Factors for the C.P. Forward position.**

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true idea of the relative merits of any two systems of strength determination. Fortunately, the term Load Factor has the same significance in both countries and the values of such factors are based on the maximum loads which it is expected that the aircraft will be called upon to withstand during the usual manœuvres appropriate to its class. Such maximum loads are multiplied by a safety factor to obtain the Load Factor, and this safety factor is officially considered to be 2 for normal flight cases in both countries. As there is, for civil aircraft, very little evidence as to the loads imposed in normal flight, and as these loads also depend on the skill and temperament of the pilots, it is not desirable to split the Load Factor into two parts for general consideration.

The value of the Load Factor depends on the assumptions made in determining the strength of the members of the structure and on the values taken for the permissible stresses of the different materials used. The high standard of strength of British aircraft is due in no small measure to the conservative nature of the assumptions and stresses used. In cases of members in compression, in bending, or in compression combined with bending, the highest permissible stress is usually the 0.1% proof stress of the material. It often happens that the permissible compressive stress is less than this, even for members in tension the ultimate strength cannot be used if it is more than 1 1-3 times the proof stress or the yield point.

In current British practice, it is safe to assume that there will be no permanent deformation of the structure at a load corresponding to three-fourths of the Load Factor, and complete collapse will not occur until a load at least 20% above the Load Factor. The existence of this 20% of "hidden" margin, which is due to the conservatism of the design assumptions and the excellence of the materials used, has been proved again and again by official tests on complete aircraft at the Mechanical Test Department of the Royal Aircraft Establishment, Farnborough.

There is no evidence in the American regulations to show that, for the same nominal value of the Load Factor, they will give strength corresponding at all points to British standards. No mention is made of the use of yield points or proof stresses in the calculations, in fact, the contrary practice of using ultimate stresses is shown for both wood and metal spars. American strut formulæ are in general less severe than the British, and so are some of their aerodynamic assumptions. There are, of course, other cases in which British assumptions are less severe than the American, and certain examples of both kinds will be considered in more detail later.

It is worth noting at this stage that the American civil factors are stated to be "not appropriate for violent acrobatics," and a warning is also given that these factors "are not sufficiently high to conform to the international requirements throughout the entire range of horsepower loading." Any discussion in this article of the I.C.A.N. factors would be out of place, but it is desirable to mention that these are based on complete collapse such as would occur in the strength test of a structure, and are not easily correlated with factor systems based on calculations.

Reference should be made to the May 1930 number of the Journal of the Royal Aeronautical Society, in which is to be found Mr. H. B. Howard's informative paper on "Airworthiness Certificates," followed by a long and interesting discussion. Many of the points referred to in this article are considered in more detail in that paper or the discussion, and are attacked from different sides. One remark made by Mr. Howard is quoted below:—

> From published records of accelerations obtained in America, it appears that American pilots habitually throw greater loads on their aircraft than is the practice here. If this is a fact, higher Load Factors on American aircraft would be essential to secure the same margin of safety.

### NORMAL FLIGHT CASES—LOAD FACTORS.

The two stressing cases for normal flight are substantially the same for both countries. The first is known in Great Britain as the "Centre of Pressure Forward" case and in the United States as the "High Angle of Attack" case, and is intended to cover the sudden pulling-up of the aircraft into the stalling attitude when flying at high speed. The second is known here as the "Centre of Pressure Back" case and in the United States as the "Low Angle of Attack" case, and covers the pulling up of the aircraft to the attitude of normal top speed from an even higher speed which has been attained by diving.

The Load Factors required for these cases by the two countries are shown in Fig. 1 for C.P. Forward and in Fig. II for C.P. Back. The British factors are in two categories, "Normal" and "Aerobatic," and otherwise vary only with the all-up weight of the aircraft. The American factors vary also with the pounds per horsepower and four representative lines have been drawn on the diagrams. Factors may be obtained by interpolation for other values of pounds per horsepower, with the proviso that aircraft having more than 20 lbs. per horsepower shall have the factors corresponding to that figure.

From inspection of the diagrams it appears that the American figures are generally higher than the British normal, and lower than the British aerobatic, figures.

It is possible for a very highly-powered light-weight machine to require an American C.P.F. factor 50% in excess of the British normal, but as no British aircraft in such a class would ever be designed without full aerobatic factors this difference falls to a maximum possible of 12%. It is, however, much more probable that British aircraft designed to aerobatic factors will have higher figures than the corresponding American ones. As an example, the C.P.F. factors required by the U.S.A. for light two-seaters, such as Moths, Avians and Widgeons, range from 7 to 7.2 against the British 7.5. This difference is not enough to account for the American statement that their factors are not sufficiently high for violent aerobatics.

There is, of course, no doubt about the suitability for aerobatics of British aircraft of this class when designed to British factors in conjunction with British methods of calculation, and constructed to British standards of inspection of materials to British aircraft specifications. The aerobatic qualities of these aircraft are continually being proved at flying meetings and in the work of Light Aeroplane Clubs all over the world. It is not unreasonable therefore to accept the American statement about aerobatics as a proof that the same nominal factor in conjunction with their methods does not give such high strength as it would in this country.

Because of the peculiar kinks in the "curves," there may

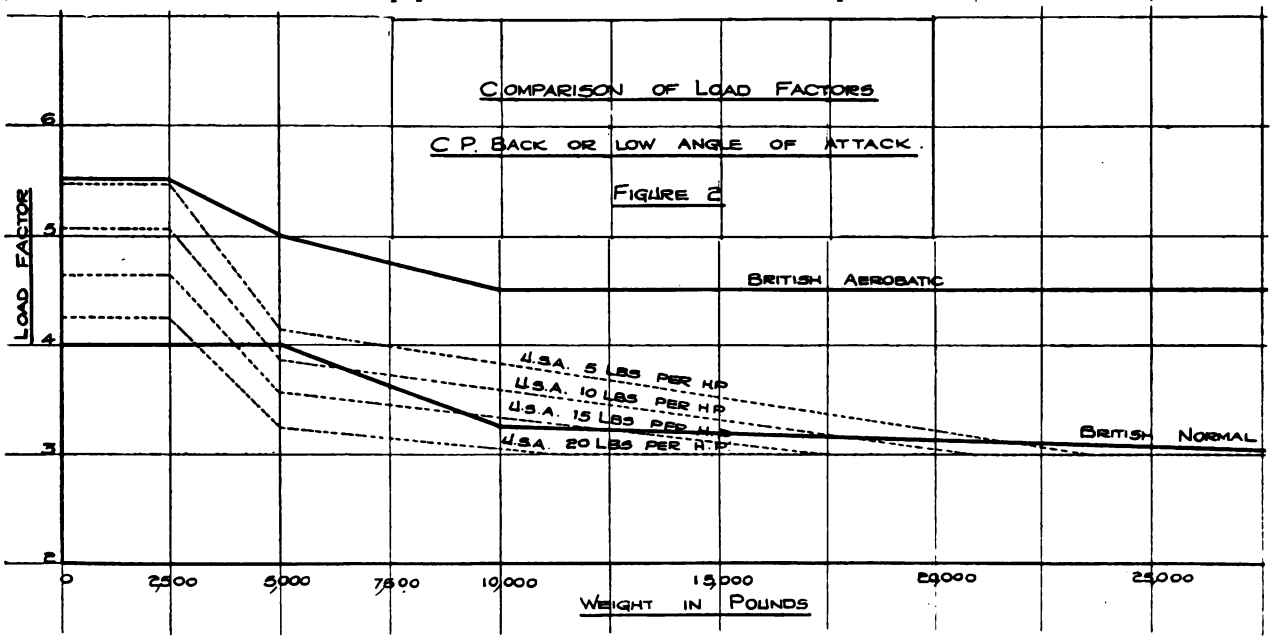


**Figure 2, which compares the British and American Load Factors for the C.P. Back position.**

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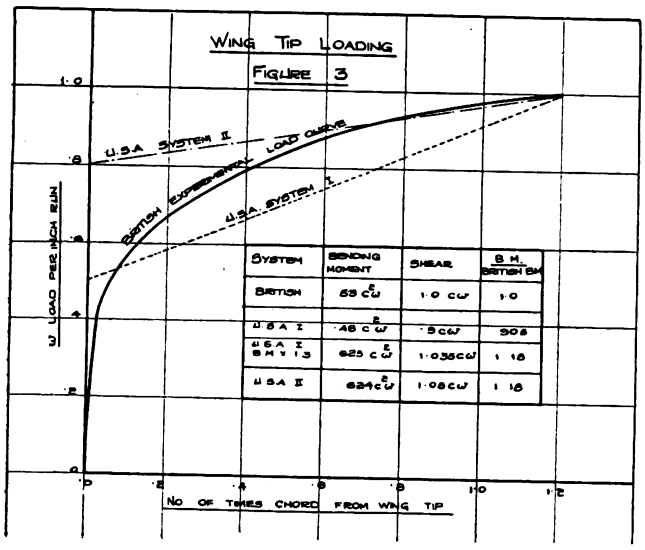


**Figure 3.**

be a considerable excess of American over British C.P.F. factors for what may be called medium weight aircraft, but as the weight gets higher the discrepancy gets less, especially when allowance is made for the fact that heavy aircraft are not likely to have less than 20 lbs. per horse-power. In the C.P. Back case, the differences are on the whole less pronounced and will very often be in favour of the British figures. In particular it should be noted that the American factors never become as high as the British aerobatic figures.

The existence of the "hidden" margin of strength already described is recognised in two rules which tend to maintain its standard, namely those requiring ribs to have 20% more strength than the nominal Load Factor and members stressed by strain-energy to have the same 20% surplus. The Americans also have a safeguard for use with strain-energy calculations but its general effect is not obvious.

### NORMAL FLIGHT CASES—AERODYNAMIC ASSUMPTIONS.

There are considerable differences between the British and American methods for determining the lift-distribution along the span for both biplanes and monoplanes, and the distribution between the planes of a biplane. The subject is too complex for detail discussion here, but it is worth while to consider a special case of the comparison between the British wing-tip load curve for biplanes, which is based on some pressure-plotting experiments, and two arbitrary systems in use in the United States.

The comparative curves are shown in Fig. 3 for an overhang of 1.2 × chord with a table giving the shears and bending moments found by integration for the three systems. If the United States system (1) is used, the bending moments must be multiplied by an empirical factor of 1.3 for determining the spar strengths up to the first point of inflection. It will be seen from the table in Fig. 3 that this increase really only means an increase of 18% in the bending moment as compared with the British value. If the same system (1) is used, the shear load at the outer strut and therefore the loads in outer wires and spars must be multiplied by 1.15. So far as the overhang shear is concerned this only means an increase over the British value of 3½%. These increases, thus reduced, must be considered in conjunction with remarks to be made later regarding spar stresses.

There are also certain differences in the determination of drag loads and positions of the C.P. in the C.P. Back case, the latter being the more important. In the British method the C.P. position is found to suit the actual top speed condition while in the United States method it is to be taken from a model curve for a lift coefficient which is to be ¼ of the maximum. Such a lift coefficient evidently corresponds to a speed of twice the stalling speed. For aircraft having a speed range of more than 2 and not having constant C.P. wing sections, the British C.P. Back position will put heavier loads on the rear spar than the American. This conclusion should be read in conjunction with the previous remarks on the C.P. Back factors.

For constant C.P. aerofoils it is difficult to make any general comparison for the C.P. Back case, as the respective requirements will probably each be the more severe at some point along the rear spar. The British assumption is that the C.P. Back position should be .1 × chord behind the supposedly constant C.P. Forward position all along the wing. The American assumption is that the C.P. Forward position still applies except in front of the ailerons where the C.P. should be found from a test with the ailerons 25 deg. down.

### SPECIAL FLIGHT CASES.

The British factors for Inverted Flight have at present the provisional value of 66% of the C.P. Forward factor for aircraft in the aerobatic class. There is no such requirement for those in the normal class. The American factors are only 40% of their C.P.F. factors but they apply to all civil aircraft. As it happens to be the writer's personal opinion that the British requirements for this particular case are too severe, criticism of the American figures must be left to those who hold a different view. It is however unfair to consider this case by itself for either country as it is intimately bound up with the nose-diving case.

In Great Britain all aircraft, including those in the civil "normal" class, have to pass nose-diving requirements which are in general fairly severe. This case provides a criterion of download on the front spars which is usually more severe than that which would be provided by an inverted flight case similar to that enforced in the aerobatic class. The corresponding American case for nose-diving is based on their inverted flight case, as the down-load on the front spars in nose-diving is assumed to be the same as that calculated with its factor for inverted flight and all the rest of the nose-diving loads are adjusted to suit.

It is very difficult to make a general comparison between an arbitrary case of this sort and the British nose-diving case which is calculated from the best available aerodynamic data and depends on the type of wing-section used. For wing-sections with a constant C.P. there will be very small loads in nose-diving and it is probable that the arbitrary American requirements will be more severe. In cases where the C.P. moves considerably, the British nose-diving requirement will certainly be more severe than the American. There is in fact a strong body of opinion in this country in favour of abolishing the nose-diving requirement altogether for civil aircraft. It might conceivably be replaced by an inverted flight case with a low Load Factor similar to the American one.

A material difference between the British and American nose-diving cases is that the down-loads on the front truss of a British biplane are assumed to be taken by the front anti-lift wires, whereas in the American method they are assumed to be taken by the incidence wires, thus putting considerable loads into the bottom drag and top anti-drag bracing. The American assumption is probably nearer the truth, especially if there is much stagger.

### CONTROL SURFACES AND CONTROL SYSTEMS.

The American figures for loads on control surfaces are arbitrary and it is not possible to compare them on general grounds with the British requirements, except to say that the latter are definitely based on the aerodynamic qualities of each aircraft. It is however possible to calculate the stalling speed which would give the American value of load per sq. ft. of fin and rudder when used in the British formula:—

Factor load on fin and rudder $= 2 \times .5_e S V_s^2$.

Vs in this formula is stalling speed in feet per second, but for convenience of comparison the stalling speeds in m.p.h. are shown against the American rudder loads in Table I. For the same loading per square foot as the British, the American load distributions are more severe in the sense that they cause bigger hinge movements. There is however no American equivalent to the C.P. movement assumed in the British tailplane stressing for the nose-dive case.

TABLE I.

U.S.A. CONTROL SURFACE REQUIREMENTS.

| Gross Weight. | Average loads per sq. foot on horizontal tail surfaces (lbs.) | Average loads per sq foot on ailerons and vertical tail surfaces (lbs.) | Stalling speed to suit British formula for fin and rudder loads. M.P.H. |
|---|---|---|---|
| Below 2,500 lbs. | 30 | 22.5 | 47.5 |
| 2,500 to 5,000 lbs. | 30–25 | 22.5-18.75 | 47.5-43.3 |
| 5,000 to 15,000 lbs. | 25–20 | 18.75-15 | 43.3-38.8 |
| 15,000 to 25,000 lbs. | 20 | 15 | 38.8 |
| Over 25,000 lbs. | 20 | 15 | 38.8 |

For control systems a recent addendum to Bulletin No. 7A gives maximum as well as minimum values for loads to be applied to the control column or wheel and rudder bar. These values are compared with the British in Table II. The American rules also state that the control system should be designed for the loads arising from the standard assumptions for loading on the control surfaces provided that these do not give loads below the minimum or above the maximum specified for the cockpit end. They do not make the justifiable comment that if the aerodynamic forces give anything like those loads on the controls, the

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TABLE II.

CONTROL SYSTEM LOADS.

| | U.S.A. | | British Load with factor. |
|---|---|---|---|
| | Minimum. | Maximum. | |
| Push and pull on top of control column. | 200 | 350 | 187.5 |
| Tangential force on rim of hand-wheel. | 75 | 125 | 94 |
| Side load on top of control column. | 75 | 125 | 94 |
| Push on one side of rudder bar. | 200 | 350 | 375 |
| Simultaneous push on each side of rudder bar. | — | — | 2×225 |

whole system requires redesign! The British loads are not intended to bear any relation to the aerodynamic loads but cover cases of the pilot using his full strength to clear a jam in the system.

### UNDERCARRIAGE REQUIREMENTS.

The British requirements for undercarriages specify the amount of energy to be absorbed by the shock-absorbing device, and leave the question of Load Factors to the designer subject to certain safety factors and overall minima. If for example the shock-absorber is an oleo leg with a spring-loaded valve so designed that it cannot develop a load greater than that corresponding to N times the weight of the aircraft, then the overall load factors required are 1.15N on the undercarriage and 1.25N on the rest of the structure. These factors apply both to the aircraft landing on its wheels only and to the three-point landing case, but the minimum values specified for the three-point landing case are 4 on the undercarriage and 4.5 on the rest of the structure. It may be assumed that the normal British practice is to keep N in the neighbourhood of 3 and consequently to work at or near the minima of 4 and 4.5 just quoted.

TABLE III.

U.S.A. UNDERCARRIAGE REQUIREMENTS.

| Gross Weight. | Factor for landing conditions. | Height of drop for design of shock absorber. (inches) | Vertical velocity. (f.p.s.) | Stalling speed to suit British formula (M.P.H.) |
|---|---|---|---|---|
| Below 2,500 lbs. | 6.5 | 24 | 11.3 | 56.6 |
| 2,500 to 5,000 lbs. | 6.5-5.5 | 24-22 | 11.3-10.85 | 56.6-53.5 |
| 5,000 to 15,000 lbs. | 5.5-4.9 | 22-20 | 10.85-10.35 | 53.5-50.2 |
| 15,000 to 25,000 lbs. | 4.9-4.5 | 20.18 | 10.35-9.8 | 50.2-46.7 |
| Over 25,000 lbs. | 4.5 | 18 | 9.8 | 46.7 |

Inspection of Table III shows that the American factors are very much higher than the British minima at the lower weights. It does not follow, however, that these higher factors will really produce undercarriages which are safer and more serviceable than the British. If the American designers have to work to a factor of 6.5, thus putting more weight into the whole structure, there will be a natural temptation to design a short-travel shock-absorber which can only fulfil the energy requirements by developing a high load, up to the factor limit. Such an undercarriage would be very uncomfortable for both pilots and passengers. If the temptation is resisted and the shock-absorbing unit designed with long travel and a reasonable limit of load, then the excess of the American factors over the actual loads developed will probably be unnecessarily large, and merely result in increased weight without any true increase in safety.

The American energy absorption requirements are expressed in inches of free drop which can readily be transformed into vertical velocities. The British requirements are expressed in vertical velocities which depend on the stalling speed according to the formula $v=3+0.1\,Vs$, where both v and Vs are measured in feet per second. It is therefore possible to determine the stalling speed which under British rules would call for the same energy absorption as a given height drop. This has been done and the results are given in Col. 4 of Table III, with stalling speed measured in m.p.h. This will enable anyone interested to see at a glance whether the American energy requirements are more or less than the British for a given aircraft with known weight and stalling speed. Any further general comparison is not possible as examples could certainly be found on both sides.

The side load requirement is also definitely higher in America than in this country, and it is also more logical in that it is combined with some up-load into a set of forces under which the aircraft can be brought into equilibrium. It is unnecessary to try and analyse this case as an alternative is given for use with "the formerly conventional V type of chassis" which is directly comparable with the British case. A horizontal load equal to the weight of the aircraft is applied at the hub of one wheel with a factor of 1.5 against the British factor for the same type of load of .7. So long as British undercarriages do not break, the American requirements seem excessive.

American tailskids are required to withstand a free drop of the same height as for the chassis, which is not laid down in the British regulations, but on the other hand no mention is made of backward load, now given in A.P.970 as half the upward load, or of the side load. In A.P.970 it is at least pointed out that side loads are very important and with that the matter is left, like so many other difficult problems, to the engineering judgment of the designer.

### STRENGTH OF STRUTS.

Comparative curves of permissible fibre stress for calculating the strength of round tubular struts are given in Fig. 4 for a representative steel with 40 tons per square inch yield point and for Duralumin. Considering the steel struts first we find that, owing to the severe assumptions with regard to eccentricity of manufacture made in the British Southwell formula, the permissible stresses from this curve are well below those given in the Johnson's Parabolic formula with C=1 used in the U.S.A. Over an appreciable portion of the curve the British figures are between 17 per cent. and 20 per cent. lower than the American.

When it is realised that British tubes are usually well above the Southwell formula when tested, it is evident that a structure consisting of struts with an l/k of 40 to 80 when designed to the British curves will be considerably more than 20 per cent. stronger than a similar structure designed to American curves. This argument does not of course apply to long Euler struts. It does however apply with equal force to the comparison for Duralumin struts between the Southwell and the American Straight line formulæ.

Bulletin No. 7A states that a Fixity Coefficient of not more than 2 may be used under suitable circumstances, and the great effect of this may be seen by comparing the curves for C=1 and C=2 shown in Fig. 4. There is at present no corresponding rule in A.P.970, but in practice the Airworthiness Department do allow the use of a Fixity Coefficient in such cases as fuselages built up of struts and flitch plates. The assumptions they use will certainly never be equivalent to a Coefficient of more than 2 and are more likely to correspond to C=1.5.

The British and American curves for spruce struts are closely similar to one another and have therefore not been reproduced.

It is desirable to make clear that there is no suggestion that American struts will not on the average stand up to the loads determined by the Johnson formula. They probably do, and any exceptions can be taken care of by the factor of safety portion of the Load Factor. But so will British struts in general stand up to loads 15 per cent. to 20 per cent. higher than those of the Southwell formula, and that is the same result that would be attained by designing them to the Johnson formula with a load factor 15 per cent. to 20 per cent. higher. The extra strength in the members to which these remarks apply will have no practical value unless all other members have a similar margin. This is, however, merely one example of the characteristics which go to make up the "hidden margin" already claimed for British design and calculation methods.

### STRENGTH OF SPRUCE SPARS.

The most noticeable difference between the British and American methods of stressing spruce spars is that the British use a uniform stress in spar stressing of 5,500 lbs. per sq. inch for spruce having a compression strength of 5,000 lbs. per sq. inch. The Americans permit stresses for the same qualities of spruce which vary with the form factor of the spar downwards from the modulus of rupture of 9,400 lbs. per square inch which applies to solid rectangular sections. British spruce also has a modulus of rupture of a similar value and a rectangular section will not actually break up till that figure is reached. The result follows that any solid rectangular spar in pure bending designed to the British standard will not really fail until

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it has reached a Load Factor 70 per cent. higher than the design factor.

The similar portion of an American designed spar will actually fail at its design factor and will have the disadvantage of showing compression shakes on its surface if it is ever subjected to a load equivalent to more than 60 per cent. of its design factor, a condition which is quite likely to occur in normal manœuvres. This particular example of the rectangular section has been chosen on account of the striking differences shown, but it must not be regarded as typical since wooden spars are very seldom solid rectangles for any appreciable proportion of their length.

From the small experience that the writer has had of the use of the American chart of permissible stresses depending on form factors and ratio of bending to end loads it does appear that the figures given are nearly always in excess of the British uniform figure of 5,500 lbs. per square inch. As the American figures are those at which complete failure will occur, there is here a further contribution to the British hidden margin of strength.

The most important case in which the American use of the modulus of rupture would lead to relative weakness is at the overhangs where the spars are in pure bending. Reference back to the paragraph dealing with wing-tip assumptions will show that the Americans use arbitrary correction factors which help to bring this point into line with the rest of the spars.

### Checking of Strength Calculations.

The differences in detail between the British and American methods extend also to the means employed for checking the strength calculations as carried out by the designing firms. Until recently the standard arrangement in this country was for the firms to submit blue prints to the Airworthiness Department, whose own staff carried out a complete set of calculations on all main structures. The work was always checked by another member of the Department and an abstract of the results sent to the firm. If the Department found any portion of the structure to be under strength they would immediately notify the firm concerned so that the official calculations could be compared with those on which the design was based.

Mistakes might be traced to either side but the probability of the firm's stressman, the official calculator and the official checker making the same error was extremely small. This system did not, however, extend to the checking of fittings and detail parts except in the case of control systems. Full responsibility for detail design rested with the firms, although the Airworthiness Department had at any rate the more important joint drawings through their hands and could query points they happened to notice.

The present British system divides the designing firms into two classes, "Approved Firms" and others. The "Approved Firms," which include all the old-established designers and constructors, now take full responsibility for the structural strength of their own aircraft, main components as well as details. Any special assumptions or divergences from the standard methods of calculation are discussed with, and agreed to by, the Airworthiness Department, and the firm send the Department an abstract of their results with a guarantee of their arithmetical accuracy.

The validity of this guarantee is usually ensured by the employment of one or more check-stressers whose work is independent of the original design stressing calculations, but can be compared with the original work as a cross check on the accuracy of the two sets of independent figures. In the case of firms, generally newcomers to the Aircraft Industry who are not on the "Approved Firms" list, the system previously described is still in operation.

In the United States, the designing firm is required by the regulations to submit not only drawings but also complete calculations covering all main components and including stress analyses of every fitting. All these are checked by the officials of the Aeronautics Branch of the Department of Commerce before an "Approved Type Certificate" can be issued. The Department deserves credit for recognising in this way the well-known fact that it is the details and not the main members which are most likely to give trouble in service. The real responsibility however continues to rest with the designers and constructors as the design of fittings cannot depend solely on mathematical analysis but must also be judged on practical grounds according to the experience of the engineers in charge.

Both the British systems work very well, with the advantage in favour of the "Approved Firms" scheme as the stress checkers are in close touch with the actual construction of the aircraft, and can inspect the components on which they are working more readily than the officials of the Airworthiness Department can. It is impossible to judge the efficiency of the American system without direct experience of its working, but it appears that considerable delays would result from its use.

In an interesting and informative article in *Aviation* for August, 1930, Mr. E. P. Warner does not however indicate any dissatisfaction on the part of the American industry with their Airworthiness system so that it is reasonable to deduce that the system can be, and is, operated without such troubles. Mr. Warner states that "In no European country is there serious attempt to make so thorough a check on design calculation as is undertaken in the United States." This claim is presumably based on the fact that the Aeronautics Department checks fittings as well as main components. Incidentally, as Mr. Warner points out, they do it all free of charge.

### Conclusions.

It has not been possible, in an article such as this, to do more than consider a few arbitrarily selected points. The two Airworthiness Authorities have solved their respective problems on generally similar lines but America has laid down far more empirical rules than has Great Britain. This probably arises from the fact that there have been so many new firms springing up in the United States who required more guidance and more control than the relatively few and highly experienced firms who have until recently been the sole care of the British Airworthiness Department.

Both the British and American systems should undoubtedly produce aircraft that are structurally safe. As far as the writer can judge, however, a British aircraft will generally have a greater reserve of strength than an American one having the same numerical Load Factor. It does not appear probable that the occasionally higher values of the American Load Factors will compensate for the British "hidden margin" except possibly in the case of undercarriages.

The very high standard of safety of British aircraft does not depend solely on the nominal values of the Load Factors, nor on the good work and sound regulations of the Airworthiness Department. It depends even more on the thorough and conscientious manner in which the British designers, workmen, and inspectors carry out their respective duties, and on the skill and judgment of our pilots in flying the civil aircraft entrusted to their care.

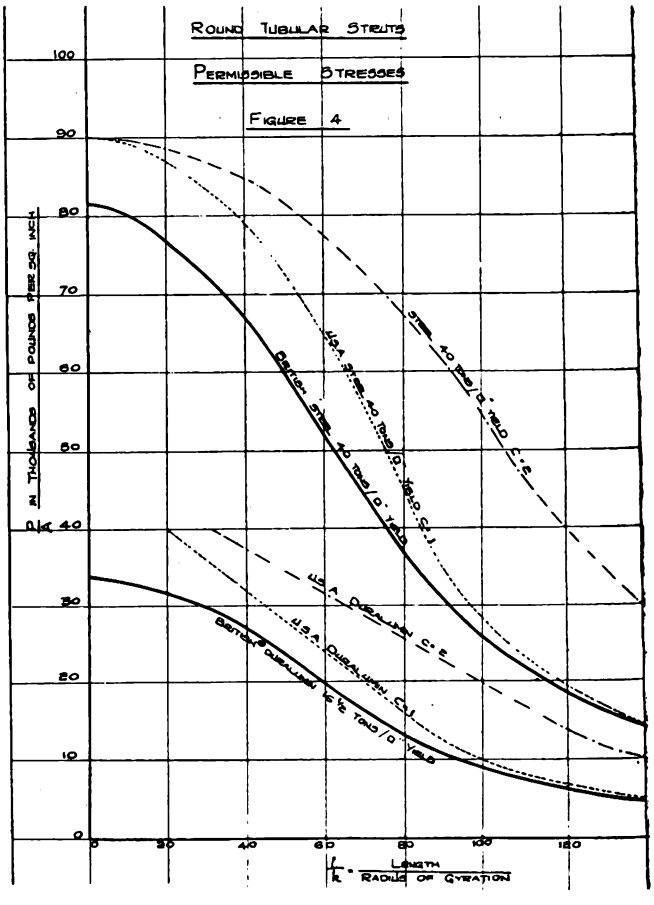


Figure 4.

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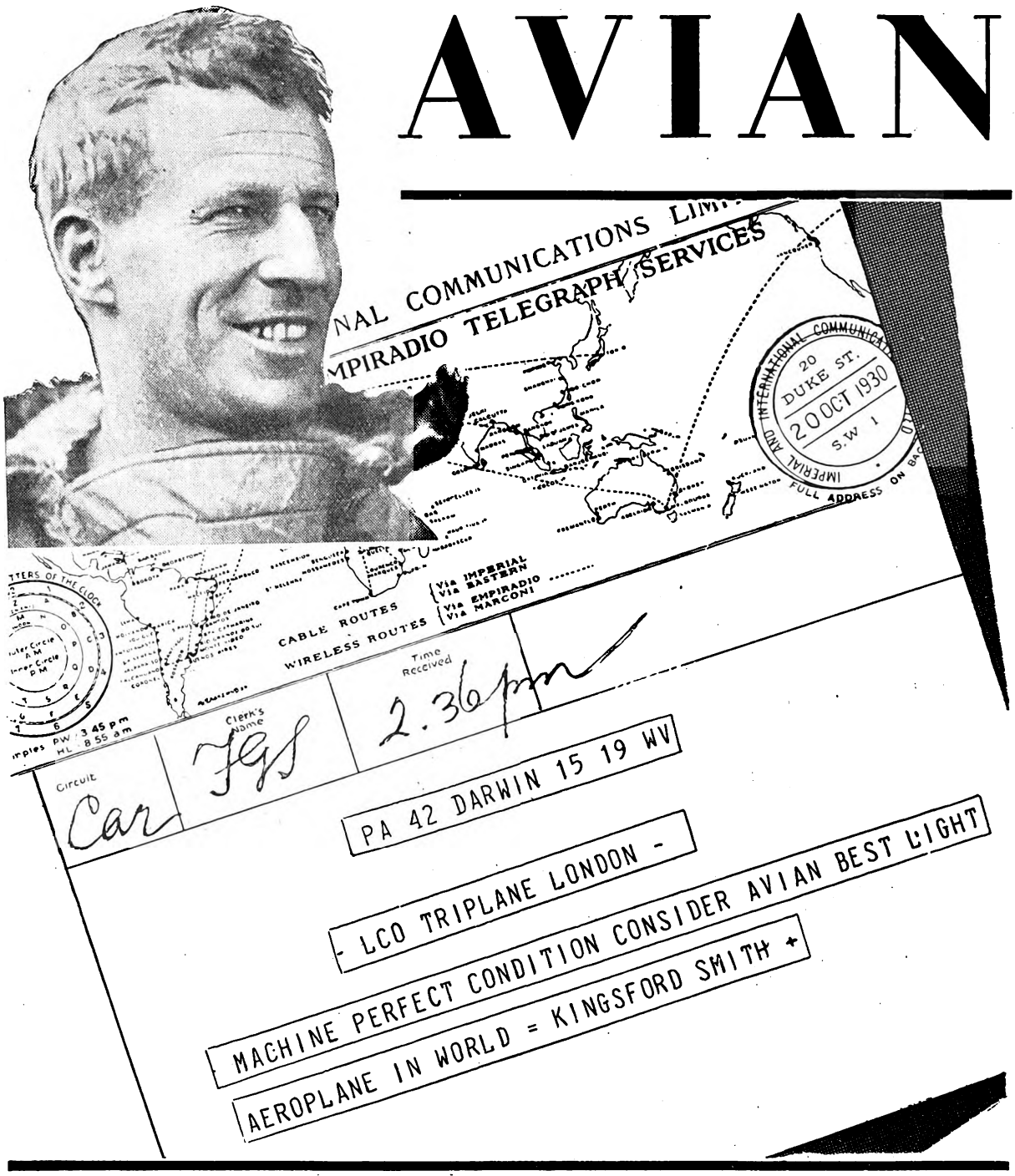


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# FLYING IN FOG.

Mr. Meredith's paper on Air Transport in Fog, which he read before The Royal Aeronautical Society on Oct. 23, was particularly interesting as being an account of the first recorded case of actual landings deliberately made through, and in fog. The valuable experiments which Lieut. Doolittle, U.S. Army Air Corps (retd.) has been making in the United States on behalf of the Daniel Guggenheim Fund have received a great deal of publicity. One must remember however that these landings in America which were certainly made while flying "blind" were also made with a competent pilot in the other cockpit in case of accidents.

[Which, incidentally, seems the obviously sensible way of doing it for experimental purposes. A fatal crash caused by having only one pilot on board would waste the whole experiment, as well as the pilot, as there would be no evidence of what happened.—C. G. G.]

The British attempts were remarkable for the fact that a system was developed in which the pilot, Flt. Lt. Oddie, had so much confidence that he was prepared to make the attempt of landing with a passenger through a belt of fog. These experiments were successful and there seems little doubt that Mr. Meredith and his team have evolved a method which can be generally used.

After his paper was over Mr. Meredith showed, by permission of the Air Ministry, a film which illustrated how the experimental flights were made, both for the take-off and landing. These were shown in slow-motion. The most striking thing was the extremely steady flight of the Lynx Avro.

As its pilot mentioned in the discussion afterwards, the system is workable if the aeroplane which is being used is stable and if the air conditions are good. An unstable or sensitive machine and bumpy weather would seriously affect its possibilities.

Mr. Meredith opens his paper by stating that he is limiting it to a discussion of the feasibility of operating heavier-than-air craft in fog with reference to the instrumental equipment required. For the purpose of this discussion fog includes all forms of weather which impair visibility such as haze, drizzle, rain, snow or dust.

He says that there is vast difference between the ability to fly in fog and the advisability of doing so, so he takes as his criterion that flying in fog is only justifiable if it does not materially increase the risk of accident.

If the fog-flying equipment is to be used in an emergency then it need not be 100 per cent. reliable, as the equipment will be only used as a way of meeting that emergency. If on the other hand the equipment is to be used for a regular service through fog, its failure must not be even contemplated.

Further the power-plant itself must be absolutely immune from failure. The failure of instruments and engines can be met by duplicating engines and instruments, but this process of redundancy is limited by the load which an aeroplane can carry.

So far as Mr. Meredith can ascertain, fog does not form rapidly enough to catch one unawares, if its beginnings or probability are instantly reported over a wide area, unless one has to cover large distances between landing grounds. According to this view on such a route as London—Paris fog-flying is avoidable and the risk and extra cost of providing equipment to fly in fog on such a route must be set against the advantage of maintaining a regular service.

The problem of flying in fog can be divided into the two parts of flying "blind" and landing. Together with the problem of landing may be taken the problem of taking-off.

Mr. Meredith made the interesting point that experiments have proved that provided the aeroplane has a normal amount of dihedral and is stable longitudinally the aeroplane can be flown with automatic control of the rudder by gyroscope and servo-motor. He also referred briefly to the automatic pilot, recently developed, which controls the elevators and rudders. This equipment has been released for civilian use. It weighs about 80 lbs. and Imperial Airways will probably test it.

The important lesson to be learned from all these experiments is that for maintaining straight flight neither the horizontal attitude nor the lateral bubble need be observed, nor need the ailerons be moved. Mr. Meredith is very emphatic about this and elaborates the theory further. He is quite sure that the ailerons do not require to be used for level flight.

Mr. Doolittle had a gyroscopic pitch-and-bank indicator developed by the Sperry Company for use for the Daniel Guggenheim Fund Fog Flying experiments and a view of this instrument is provided in Fig. 1. A silhouette of an aeroplane flying away from the observer is affixed to the cover glass. This moves with the machine. The white horizon attached to the gyroscope remains in position, thus the silhouette shows the position of the machine in relation to the horizon. When the nose is up the silhouette appears above the white line and *vice versa*.

For the reasons which he has stated Mr. Meredith prefers a pitch-and-yaw indicator. An instrument of this kind has been developed by Farnborough, and is illustrated in Fig. 2. When the aeroplane is in the correct position a white spot is eclipsed by a black spot in the middle of the glass, when the nose dips a white crescent emerges and also when the machine yaws. Another instrument of the same type but electrically driven has been produced by S. G. Brown Ltd. This is illustrated in Fig. 3.

[Yet another new instrument, which one has recently had the privilege of seeing, has been developed by Sq. Ldr. Reid, of Reid and Sigrist Ltd. It bids fair to equal in accuracy and reliability anything in the way of gyro-indicators that has been produced so far—and it is likely to be available to private owners at a reasonable price.—C. G. G.]

Mr. Meredith is satisfied that we have the necessary equipment for flying blind and its selection must depend upon reliability. Redundancy, such as the use of a turn indicator as well as an automatic pilot or pitch-and-yaw indicator is essential.

Not only must one be able to fly straight in a fog, one must also find one's destination. For this some other aid is essential so radio has to be used. There are four main systems. The first is direction-finding on the ground and has been successfully used in this country for some years. The position of the aeroplane is determined by cross-bearings taken from two ground stations and is transmitted to the pilot.

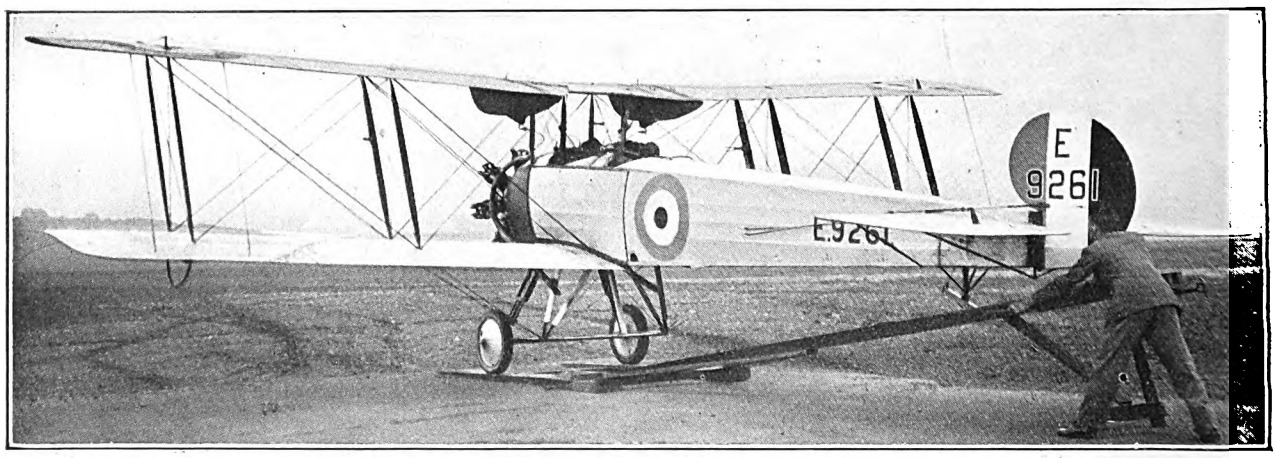
The second system is direction-finding from the aeroplane itself and in this the signal strength in two different aerial systems on the machine is compared and the pilot flies to keep the aeroplane headed for the transmitter. This system has the advantage that it alone supplies all the information for directional control.

The third system includes the various methods for indicating tracks. Of these Mr. Meredith only mentions the equi-signal beacon which was extensively used by the Daniel Guggenheim Fund. This system has the advantage that the ordinary radio equipment can be used and the only extra unit needed is that which contains the indicating reeds.

In this system two signals are transmitted in such a manner that each is of maximum strength on a particular bearing from the transmitter, whereas the two signals are of equal strength on the bisecting bearing. This equality of signal strength occurs at four cardinal points so that the pilot has to determine which beam he is in.

The fourth system, that of rotating beacons, gives the pilot his bearing from the beacon on which his receiver is tuned. This beacon has a sharply defined minimum in its field and when this minimum is pointing due north a characteristic signal is emitted. As the field is rotated at a regular speed all the pilot has to do is to take the time from the characteristic north signal to when he hears the signal is at a minimum.

If a stop watch graduated in degrees is used the answer may be obtained directly. This system also has the advantage of adding nothing to the normal radio equipment. If two such beacons can be received the pilot can obtain his position.




**The Lynx Avro on its special fog-launching ramp. This was designed to send the machine off at its proper climbing attitude.** —*(R.A.F. Official photograph.)*

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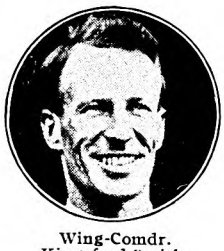
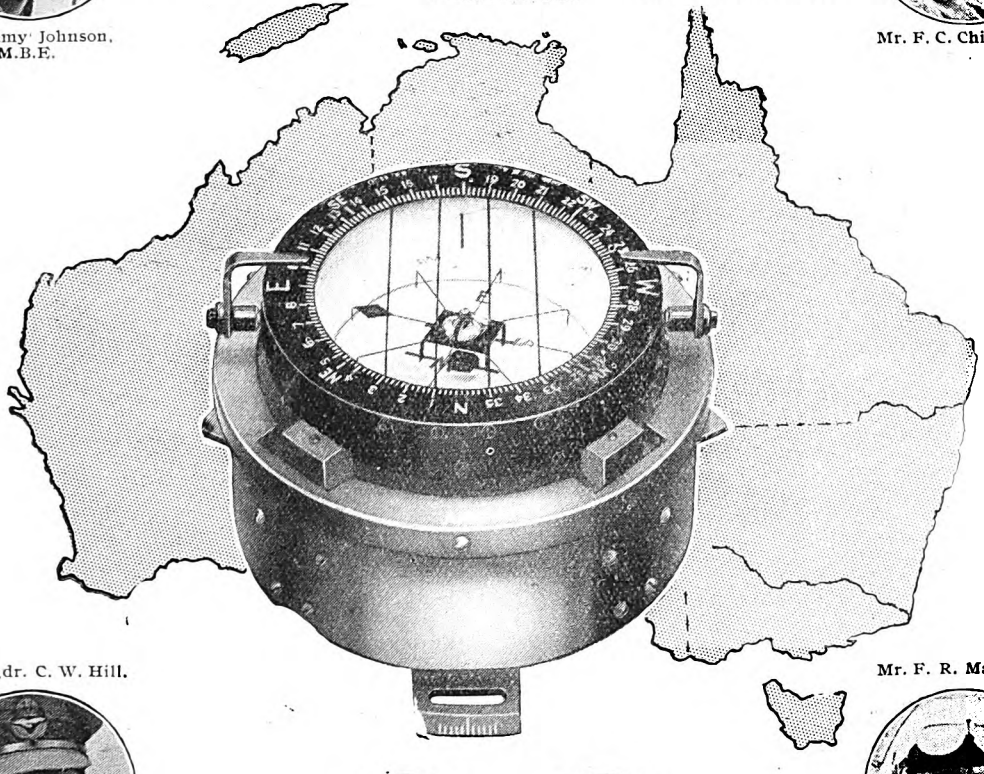

Wing-Comdr. Kingsford-Smith.

Sqdn. Ldr. H. J. L. Hinkler, A.F.C., D.S.M.

Mr. F. C. Chichester.



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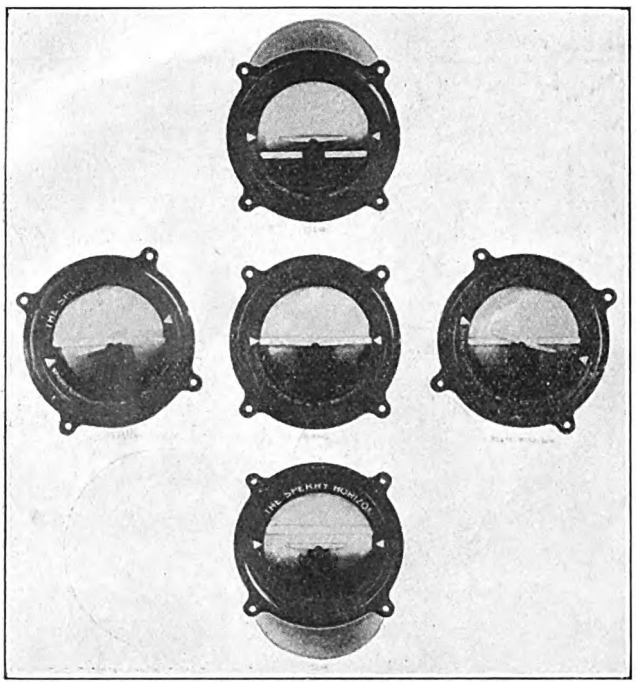

**Figure 1.—The Sperry Artificial Horizon.**

Having dealt with the problems of flying straight in fog and finding one's position, Mr. Meredith then attacks the most difficult part of his subject,—that is landing. The experimenters on behalf of the Guggenheim Fund were able to land blind by following an equi-signal beacon and finding out when they were directly over it by a sudden drop in signal strength. A very sensitive altimeter was used to give the height and the machine was just flown straight onto the ground with a specially strengthened undercarriage.

Mr. Meredith visualises a solution of the fog-landing problem by the use of the ordinary radio receiver to lead the aeroplane over the landing ground and for fixing the moment at which the engine should be throttled back. A barometric altimeter would fix the height.

After referring to other methods of measuring height, Mr. Meredith says that the ordinary barometric altimeter will give the height with much greater accuracy than is required for fog-landing, provided the ground barometer reading is transmitted to the pilot. A method of flattening-out has been developed at Farnborough and this Mr. Meredith proceeds to describe, as well as giving an account of the experiments which were made by Flt. Lt. Oddie and Mr. Sudworth.

The Lynx Avro was launched from a special ramp to which it was secured by a quick-release device. The attitude of the aeroplane on the ramp was chosen to correspond with that on a slight climb. When the pilot released the gyroscope of the pitch-and-yaw indicator in this position he was provided with a datum in place of the horizon.

As it had been shown that an aeroplane approaching the ground at a certain speed (about 20 per cent. above stalling speed) would reach the ground horizontally at stalling speed if full elevator were applied at a certain height, all that had to be done was to produce a device which would signal the time to pull back the control stick.

Mr. Meredith developed a very simple gadget for doing this which has the somewhat grandiose name of "ground proximeter." This was a weight suspended 14 ft. beneath the machine and connected thereto with a linen thread which in turn was fixed to a trigger. As long as the weight was suspended a green light showed about the cockpit, as soon as the weight dragged along the ground two red lights went on. These were independently wired and had independent batteries to prevent the chance of failure. [Much the same thing was commonly used by the Royal Naval Air Service during the War some fifteen years ago.—C. G. G.]

As can be seen from Fig. 5 the instruments used for these fog-landing experiments were not extensive, three indicating lamps in one case, a pitch-and-yaw indicator and an air-speed indicator.

About 100 landings have been made by this method and three different pilots have found that there is no marked difficulty in the manœuvre unless there is enough wind to produce a marked wind gradient. To meet this difficulty, which produces a loss of speed as the aeroplane approaches the ground, the landing is made a little faster.

The pitch-and-yaw indicator was so mounted that as the pilot closed the throttle he automatically moved the indicator through such an angle that by keeping the white spot in the middle the pilot kept the machine at the correct gliding angle.

For landing by the balloon the pilot noted the assigned compass course on the ground and then took off. When he had reached the height of the balloon, from 370 ft. to 420 ft. above the ground, he flew away from the aerodrome on a parallel course to the assigned course into which he turned through 180 deg. He then flew towards the balloon and when the compass had settled down, corrected his course and released the gyroscope of the pitch-and-yaw indicator. He then manœuvred alongside the balloon and closed the throttle. After that he had to keep the pitch-and-yaw indicator in the middle until he received the signal to pull back the stick.

After fifteen landings had been made, taking-off and landing through a belt of fog were considered safe if an observer on top of the balloon-shed at Farnborough was clear of fog. This was to ensure that the balloon, which was too small to carry a man, was clear of the fog. On the morning of June 18, 1930, weather conditions were suitable at sunrise and five landings were made through fog some 90 ft. deep. The visibility in the fog was variable, but the pilot could not see the ground after entering the fog.

The maximum errors (from a mark in the middle of the aerodrome) with the balloon at a height of 400 ft. were 95 yards in range and 50 yards in line. A few tests were made with the balloon at 750 ft. and these indicated that the errors would be about double those at 400 ft. This method therefore appears practicable on any large aerodrome through a fog which extends up about 700 ft. provided means could be found of ensuring that the balloon was in clear air.

Mr. Meredith suggests that some means, perhaps acoustic, should be used to check from the ground the position of the incoming machine. If this did not prove possible and the balloon method was not being used some duplication of the method of checking the height from the ground should be used.

Dealing with the risk of Collision, Mr. Meredith points out that flying in fog or cloud could reduce this risk as it would prevent pilots from all flying at the same height from which they could just see the ground. He also refers to the system of keeping each machine at its respective height or at least limiting the machines going in the same direction to the same height. [Another method is to develop a radio-proximeter, on the lines suggested in this paper three or four years ago, which will give a pilot warning of the approach and direction of any other machine. The N.A.C.A. (U.S.A.) is in fact at work on such an instrument.—C. G. G.]

Mr. Meredith shows that special fog-flying equipment adds but little to the normal equipment of instruments and is indeed limited to the sensitive aneroid, the reed indicator and the ground proximeter.

He does not think that fog dispersion or using infra-red rays to see through it are capable of practical use at the moment.

In conclusion he says that air transport in fog is immediately practicable but involves an element of risk. Aeroplanes must be equipped for flying in fog when they have to fly such distances that they may be enveloped before they can reach a landing ground. But flying in fog should be avoided whenever possible.

### THE DISCUSSION.

MR. FAIREY, opening the discussion, said he was disappointed to learn that the bubble was of no real use for fog-flying. Before the War they were all taught to fly by following the bubble with the top of the stick. In this connection he would like to ask Mr. Meredith what he thought of the piece of string which was tied to the elevators [these were in front on the old box-kites—ED.] and used as a pitch-and-yaw indicator.

He also told the story of how Cdr. Rogers, U.S.N., after being forced down on the sea with his radio transmitter out of action, heard the two cruisers asking each other "why the darn fool did

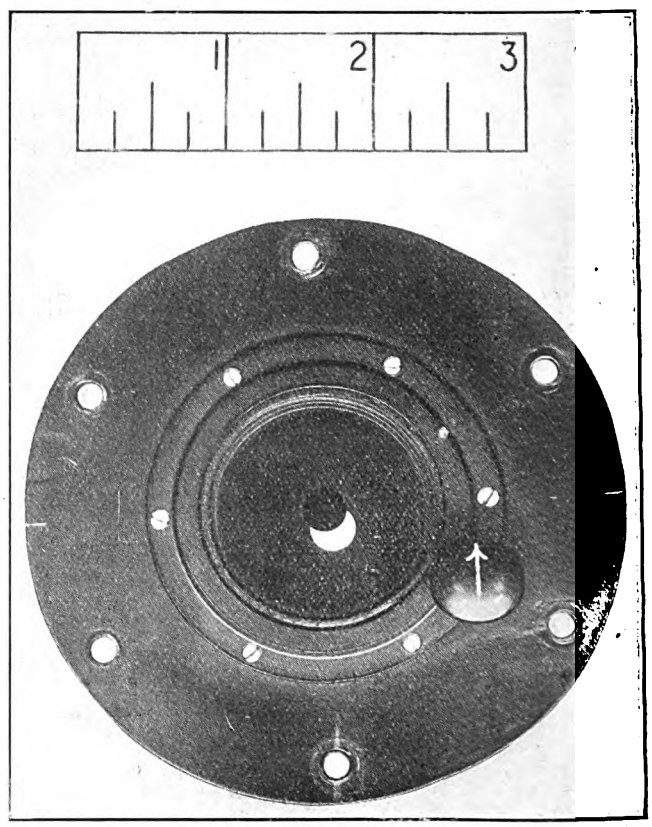


**Figure 2.—The pitch-and-yaw indicator developed at Farnborough.** —*(R.A.F. Official photograph.)*

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not use his radio?" Cdr. Rogers had been testing out a direction-finding system from the flying-boat and was unable to find the cruiser. Finally he was forced to land and was drifting about the sea for nine days before he was picked up.

Mr. Fairey mentioned that the proximeter was the invention of Mr. Meredith. He thought that we now had enough data for landings to be made in fog on any aerodrome with this proximeter and a balloon.

FLT. LT. J. S. ODDIE, who was the pilot who did all the experimental fog-flying, was the next to speak and pointed out that the difficulty or otherwise of flying in fog did not depend entirely on the instruments. It also depended upon whether the machine was easy to fly and on the state of the pilot's mind, which had to be calm like the weather conditions for the best results.

He had very great faith in direction-finding by radio from the aeroplane itself. They had shown that it was possible to land safely through a layer of fog, so if one had directional wireless to pick up the balloon the system became practicable for finding the aerodrome through a layer of fog and landing thereon.

MR. R. S. CAPON, the Superintendent of Scientific Research at the R.A.E., mentioned that a fog-landing demonstration about a year ago had to be postponed because of fog. We had now progressed a little further than that. He laid emphasis on the necessity of having aeroplanes 100 per cent. reliable before fog-flying became practicable, as a forced landing in fog was out of the question.

MR. STEWART, of the R.A.E., referred to the fact mentioned in the paper that if a pitch-and-yaw indicator were used a turn-indicator was not necessary and said that in Lieut. Doolittle's experiments both kinds of instruments were used.

He expressed the opinion that the ordinary public would not part with good money to be landed in fog. He asked how we were going to fix the spot in space from which to start the descent if the balloon was not available.

MR. H. E. WIMPERIS, the Director of Scientific Research, pointed out that the experiments at Farnborough were not the first in fog-flying and said that when he was in the United States he saw the machines and instruments which were used by the Daniel Guggenheim Fund. He said that the fog of instruments was worse than that of the atmosphere.

He also said that there was no attempt to flatten the machine out when landing and it was flown onto the ground. It had a specially strengthened undercarriage. He noticed also the sturdy net which had been provided to catch Mr. Doolittle's face if the landing was harder than expected.

He also told the story of the weather station which replied to the question about weather conditions by saying "visibility nix—even the birds are walking." He thought that the R.A.F. would find the balloon method of great value, but would civil aviation be able to use it, or if they could not now, how long would it be before they could?

MAJOR BRACKLEY, of Imperial Airways, said there were pilots present who had had a lot of cloud-flying experience and he hoped they would have something to say. Referring to the statement by the lecturer that fog-flying was avoidable on the Paris—London route, he said that it was not, and that a lot of regular flying had to be done through fog, or cloud joined to fog.

Their pilots had found fog-flying very difficult. The Brown pitch-and-yaw instrument seemed very useful. Referring to direction-finding by radio from the machine, this method was being tried out by them on their Near-East routes and had been found to give excellent results. The range was up to 100 miles.

MR. F. TYMMS said that we must continue to study flying in fog and that such flying was not necessarily the most difficult form of

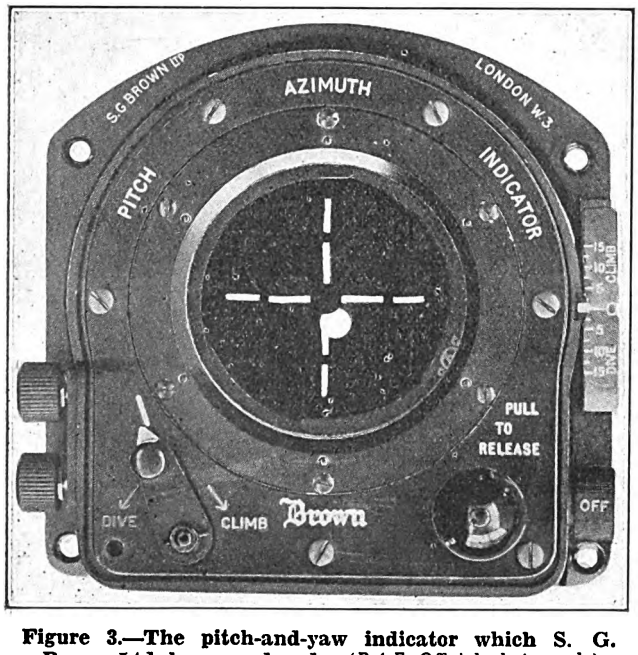
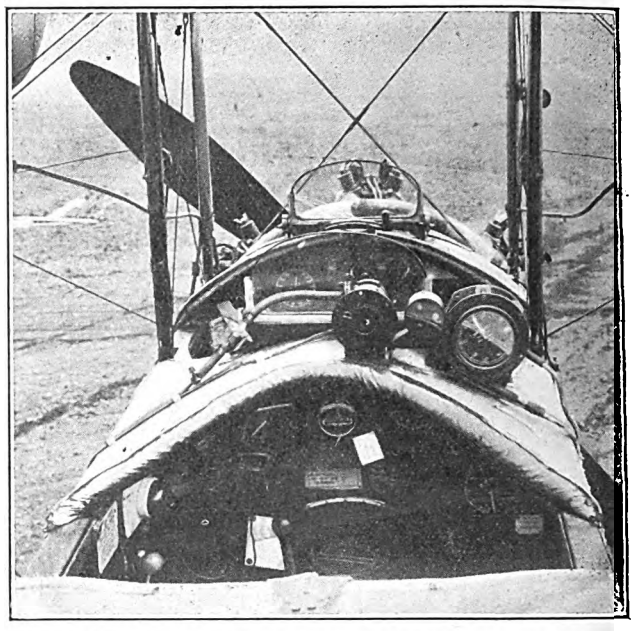



**Figure 3.—The pitch-and-yaw indicator which S. G. Brown Ltd. have produced.**—(*R.A.F. Official photograph.*)



**The only two gadgets used for fog-landing. The pitch-and-yaw indicator is mounted next to the three signal-lamps. The third instrument is an A.S.I.**
—(*R.A.F. Official photograph.*)

transport in fog. Only the take-off and landing at either end of the flight were the critical features. The risk of collision in the air was a point which had to be watched and already the zone method, as outlined in the paper, was being used on the cross-Channel route. The machines were advised by wireless to fly at certain heights.

He thought a fog-flying system was no use if only designed for emergency; the pilots would lose confidence. As the essence of Air Transport was regularity, a system must be developed which would enable flying to be done regularly. [The Marine Mind has not yet developed any method of getting ships through fog regularly, so we are no worse off than they are.—C. G. G.] He referred to the fact that a beacon of the American track type was being put in at Croydon, and would be oriented on Dungeness or Hastings to give a general indication of the route. [Which means that pilots are thus asked or forced to fly a long sea route which ought never to be used at all by landplanes. Such a beacon would be far more useful on the Calais—Lympne line, for aeroplanes coming from Cologne, Brussels, and Amsterdam.—C. G. G.]

A rotating beacon was being put up at Farnborough which with the one at Orfordness would make two.

He said that the American track-wireless and intensive lighting systems had a tendency to deprive the pilot of responsibility and ignored the possibilities of navigation. The G.A.P.A.N. were aiming to establish a school of Air Pilotage. He queried whether it was possible to use the wing-coil system without using a compass?

MR. WILCOCKSON, of Imperial Airways, said he found the bubble most useful for cloud-flying, especially in machines which had servo-controlled ailerons and had therefore not got the normal "feel."

MR. BRAMSON suggested that a bubble would be useful if one had a yaw-indicator as well. He suggested that a listening-post might be used to fix an incoming machine's position for landing in fog. He said that Mr. Stewart gave the public too much credit for technical knowledge in supposing they would know the risks they ran in flying in fog.

A representative from Henry Hughes and Son Ltd. explained the system which the late Sq. Ldr. Johnson used in piloting the R.101. He took three bearings on a wireless station while on a known course and this enabled him to fix his ground speed. From this it was possible to navigate on any desired course.

MR. OLLEY said that he would rely on a bubble for flying in fog without any other instrument.

MR. MEREDITH in his reply first dealt with the great bubble question and said that if there was no acceleration then your bubble did give you your tilt. But there was no need to use your bubble or ailerons in cloud or fog-flying. This had been proved by the use of the automatic pilot which only controlled the elevators and rudder. The ailerons were not controlled by it but hundreds of miles had been successfully flown by its use. [That is all very fine, on the theory that fog only exists in still air. But quite definitely it is not true of a Channel Fog, which often exists in half a gale, and it is not true of flying in low cloud on a windy day over ridges like Beauvais or Caterham. If ailerons are not used the machine will wallow and yaw all over the place, passengers will be bumped to blazes, and the pilot will find himself like the wretched War-time pupil, who, after a terrible exhibition of unintentional aerobatics on his first solo flight, got down in one piece, by the Grace of God, and told his instructor that he was very sorry, but he didn't know what to do when the bubble began to foam.—C. G. G.]

He thought that it would be criminal folly to fly with passengers and try to land with them in fog under present conditions. He agreed with Mr. Bramson that an acoustical listening post might be a way of fixing the position of the incoming aircraft.

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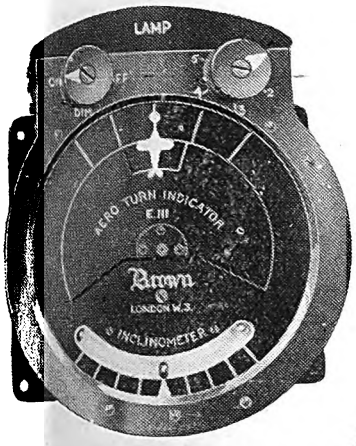


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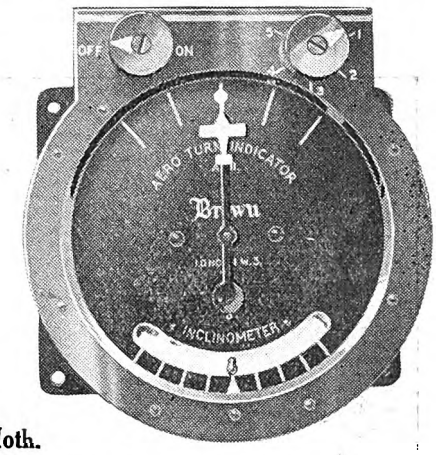


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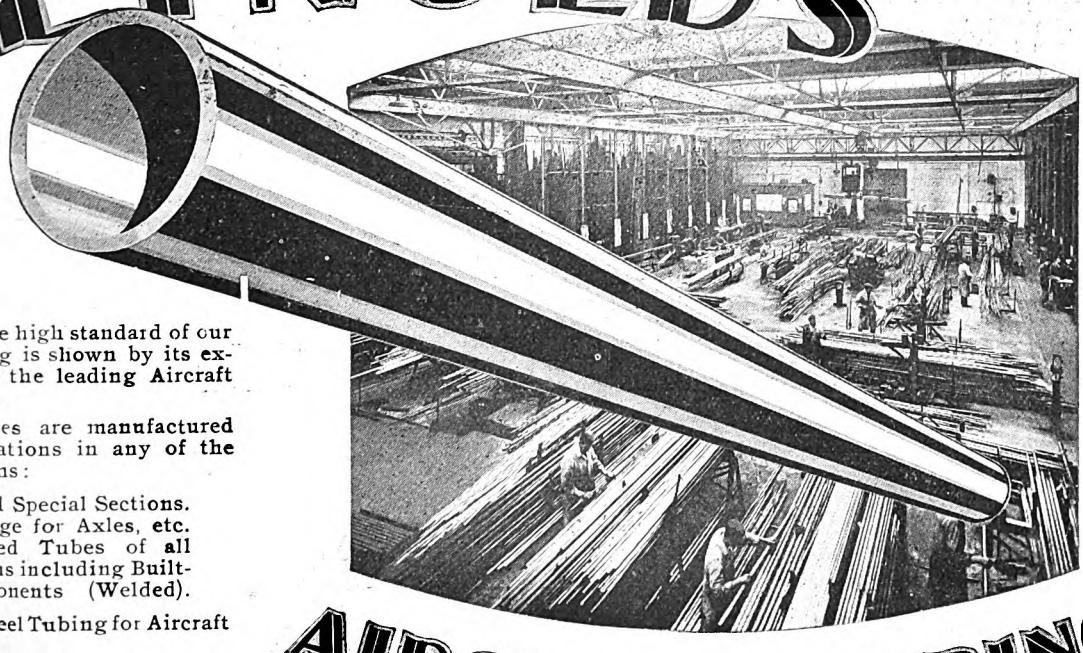

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## AIDS TO NIGHT-FLYING.

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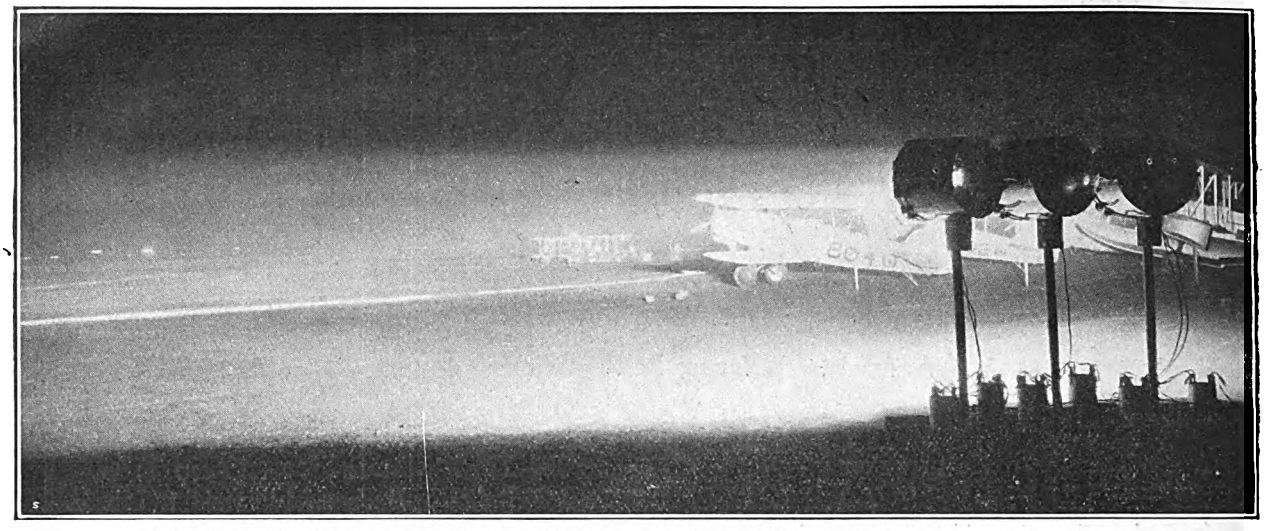


DAY AND NIGHT ARE BOTH ALIKE.—Siemens floodlights lighting an American Airport.

Until quite recently, equipment for safe landing at night on emergency landing fields has left much to be desired. Emergency landing fields are, in Germany, provided along the air way at distances of about 20 miles, all of which are situated in the vicinity of the airway beacons. As soon as darkness comes an attendant places a series of oil lanterns in the direction of the wind along the landing area; these lanterns indicate to the pilot of the aeroplane the direction and length of the landing area.

This equipment must be regarded as somewhat primitive. A well-equipped landing field should be provided with efficient boundary-lighting as well as a reliable wind-indicator and, if possible, with floodlights for illuminating the landing area. Because, in Germany, it is for the time being impossible to employ a full-time attendant for each emergency landing field, it would be necessary to keep the lighting plant in operation all night. Apart from the expense of providing such an equipment for the emergency landing fields, the running costs would be prohibitive.

Assuming a landing field with two floodlights of 10,000 watts each and 20 boundary lights of 100 watts each, the total requirements amount to approximately 22 kw. Taking the average throughout the year, the entire plant is in operation for about 12 hours daily, so that the costs for current alone would amount to £1 10s. to £2 per day. To this must be added the capital and maintenance costs, and it is obvious that this expenditure would not be justified until night traffic becomes much heavier than at present.

The engineer was thus faced by the problem of improving the efficiency of the lighting plant. The solution lies in putting the plant in action only when it is actually required; in other words, the plant must be capable of being controlled from the aeroplane.

Apparatus has now been developed which solves this problem perfectly and thus forms a further step forward in flying at night. A brief description of the apparatus follows:—

Three methods were available for solving the problem of the remote control of the landing field's lighting installation, namely, light-waves, electric-waves and sound-waves.

The light-wave method was at once ruled out of account because, as will readily be understood, the aviator, obliged to land in an emergency, could not be expected to find the lighting relay with his searchlight, to put it into operation. Such an equipment would certainly fail in misty weather. Also it could not be prevented from responding uselessly in a bright moonlight night. It would furthermore be necessary to put the equipment out of action in daylight.

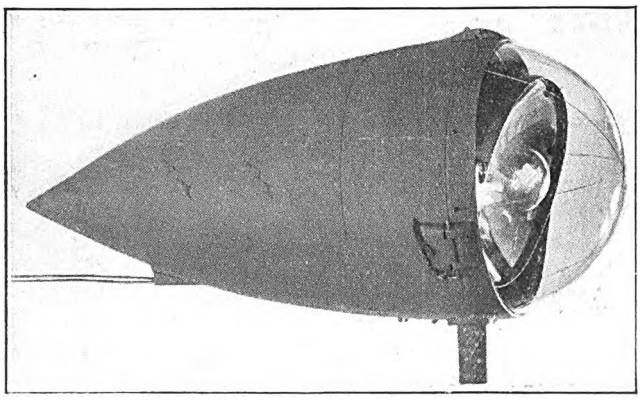
Electric waves provide a better method. Their use has, however, been abandoned for this purpose because a simpler and cheaper way have been found by employing sound waves. Sound spreads uniformly in all directions and may be produced by simpler, more easily operated, and cheaper apparatus, and has the further advantage that it will function under all weather conditions. The range of the sound is, furthermore, great enough to control the receiving apparatus from a distance of several miles.

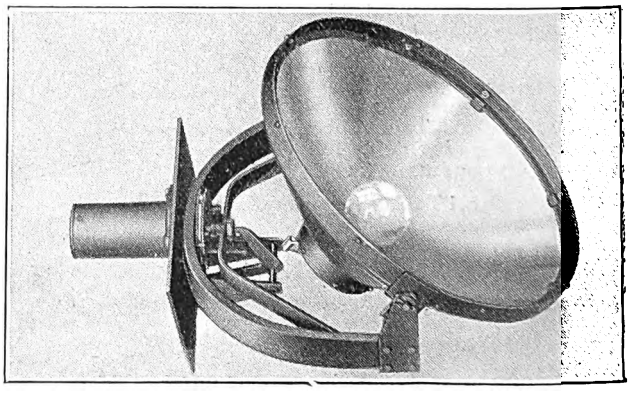
The receiving apparatus must fulfil a number of requirements, mainly simplicity, reliability, sensitiveness and low energy consumption. Above all it must possess high selectivity, that is to say, it must respond to waves of a definite frequency only, as otherwise the lighting plant would be switched on by motor-car horns, locomotive signals or the upper harmonics of motor-car or aeroplane noises.

The apparatus now developed fulfils all these requirements. The sound-waves, emitted from suitable apparatus on the aeroplane, are received by a sensitive microphone and converted into electric impulses of equal frequency. A reed relay is connected in the microphone circuit; the relay will close only when the frequency of the impulses equals its natural frequency. The energy consumption of the microphone and the reed relay is very low. A grid hot-filament tube filled with neon gas serves as amplifier and its anode current energises the main relay and switches it into circuit.

A siren, driven by an air-screw, is used for producing the sound-waves. The siren may either be mounted on a jib which, when not in use, is accommodated within the body of the aeroplane, or may be rigidly mounted on the body or a strut of the aeroplane; the shaft is held by a brake when the siren is not in operation.

During the first experiments the aeroplane, at the moment of starting the siren, was at a height of 850 yards, and the distance from the landing field was 1,100 yards. Since then the active range of the relay has been greatly extended. The selectivity has likewise been improved by con-





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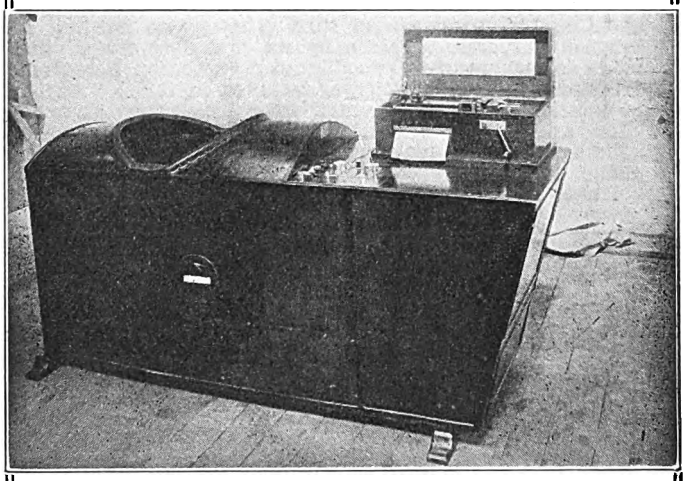

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*Extract from "The Aeroplane" report on the King's Cup Race held on 5th July, 1930: . . . . . Mrs. Butler whose companion was Miss Sale-Barker, who was discovered by, and has since vindicated, the Reid Aptitude Indicator,—between them they put up a very fine performance, and flew into fourth place.*

*Sole Patentees and Manufacturers:*

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structing the relay so that it must receive two impulses of different frequencies in definite sequence before it responds; an accidental switching on of the lighting plant by other sources of sound is thus practically eliminated.

The application of the novel sound relay can be varied and developed in a number of ways. Thus the relay may be made to operate an alarm gong in the landing-field attendant's quarters.

Wind and direction indicators as well as bearing marks might also be switched on by the sound relay. A clockwork device can therefore be provided which interrupts the current of the sources of light after a few minutes.

Apart from the above equipment of the emergency landing fields it will also be necessary to provide the aeroplane itself with a searchlight of greater intensity, because, on sudden failure of the motors, the pilot must be able to land without further auxiliaries. Development will undoubtedly proceed in the direction of searchlights of more than 1,000,000 c.p. light intensity with a capacity of 600 to 1,000 watts, although the extra load is undesirable from the designer's point of view. Safety first must always remain the supreme factor.

Herewith is shown a new Siemens-Schuckert Searchlight with special lamps. At a distance of 500 yards the illumination of the ground is 6 lux, which is equal to 24 times the illumination of a clear full-moon night. The mirror of the searchlight, and hence the beam of light, may be deflected through a large angle, horizontally as well as vertically, by means of a control handle.

Generators, driven by means of self-regulating windmills, are provided for the searchlight and the general supply of current for the aeroplane.

## CONCERNING BRITISH LIGHTS.

Not long ago Airwork, Ltd., of Heston Air Park, inaugurated a night-flying session with facilities for instruction and practice in the dark. The popularity of the innovation left no doubt of the interest of pilots in general, and the future of night flying may be taken as assured.

On a clear night, with lighted aerodromes at reasonable intervals, night flying need be very little more dangerous than ordinary day travel. Lighted aerodromes are at present practically non-existent, but cannot long remain so when more people are flying every day and cannot always be sure of reaching their destination in full daylight. The growing list of municipal aerodromes will eventually represent an extensive system of possible night-landing grounds by pure pressure of public demand.

When that day arrives the name of Chance Brothers will scarcely be a novelty to the air traveller, any more than it is to-day to seafaring folk and those whose business brings them into touch with lighthouses, lightships, light buoys, leading lights and all the multifarious marine safety devices which depend on illumination for their functioning.

With a century and more of experience Chance Brothers and Co., Ltd. have turned their attention to lighting for aviation purposes. Personally we first encountered their name as makers of the floodlight on Stevenson Aerodrome, Winnipeg, Canada, which was installed in 1929. The light in question, the night air mail to other Western Canadian cities, and a neon beacon on the Hudson Bay Company's building, were all inaugurated together with considerable public excitement.

There, as elsewhere, the Chance equipment had an advance reputation by reason of their long experience in lighting the sea lanes and producing the right reflectors, lenses and specifications for whatever the particular job might be and the illuminant which was available. Electricity is universal on aerodromes, but the fine art of adapting optical apparatus to specialised outdoor illumination is theirs of old.

At Croydon the large illuminated landing "T" is the work of Chance Brothers, and their reflectors enter into the make-up of the big floodlight.

At Heston, and Brooklands night flying has been practised recently with the help of the Chance "utility landing floodlight." This is a piece of equipment that will probably appear on most aerodromes before long.

The light itself is mounted on a two-wheeled trailer by means of three adjustable jacks, and this attachment allows the beam to be adjusted to the right angle for any position of the trailer. The system is thus light, readily portable and inexpensive. The lens is of a design which concentrates the beam into a relatively shallow vertical depth but spreads it in fanwise over an arc of 180 degrees, and the 10-kilowatt gas-filled lamp, intensified by metallic spherical mirrors, gives 850,000 candle power. Focussing and cooling devices are incorporated.

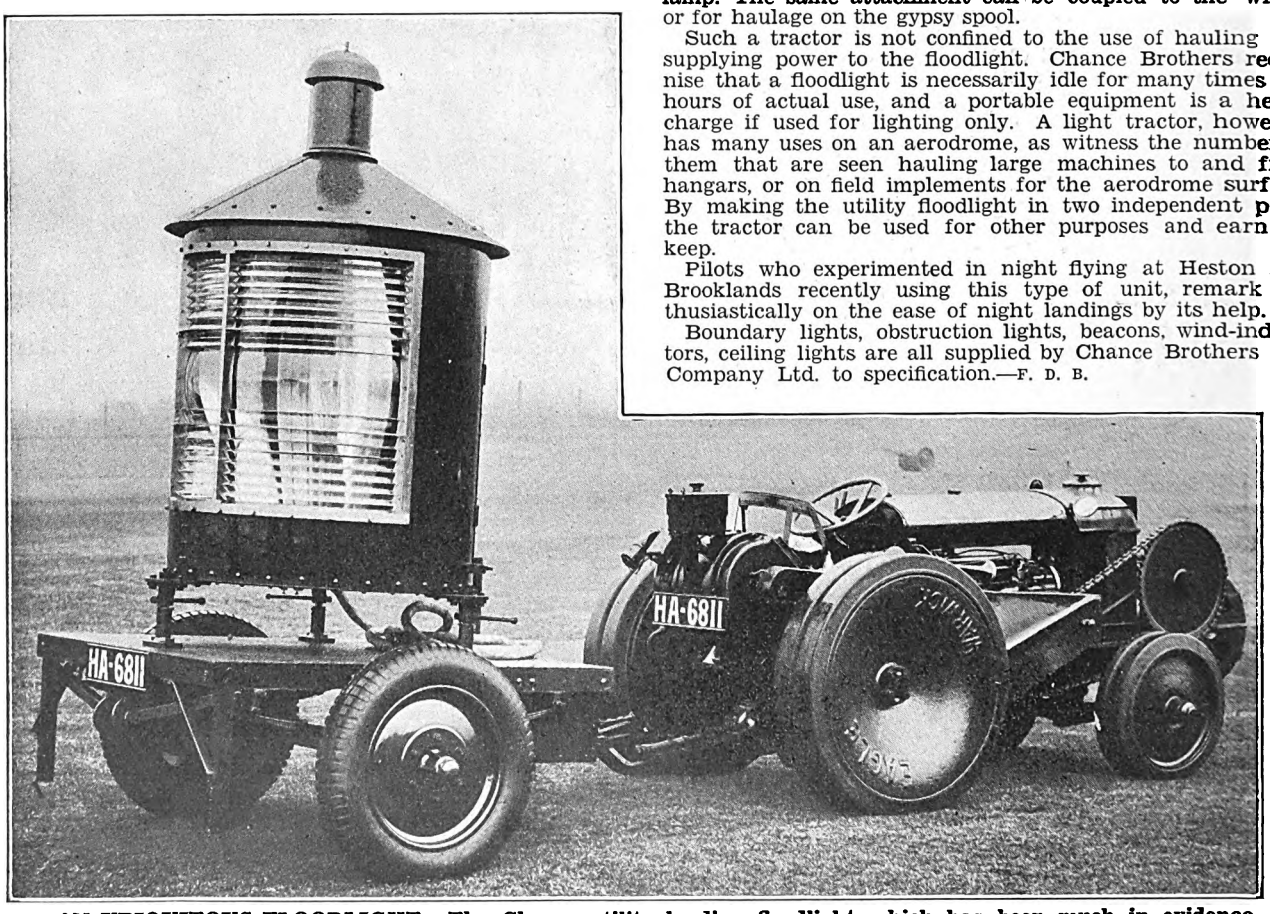
The standard power-unit for this floodlight is the Fordson tractor, although any other make can be supplied. Any type of wheel tread is obtainable to specification.

The tractor performs the dual rôle of motive power and electric power supply. A power "take-off" operates the special generator and gives ample power for the 10 K.W. lamp. The same attachment can be coupled to the winch or for haulage on the gypsy spool.

Such a tractor is not confined to the use of hauling and supplying power to the floodlight. Chance Brothers recognise that a floodlight is necessarily idle for many times the hours of actual use, and a portable equipment is a heavy charge if used for lighting only. A light tractor, however, has many uses on an aerodrome, as witness the number of them that are seen hauling large machines to and from hangars, or on field implements for the aerodrome surface. By making the utility floodlight in two independent parts the tractor can be used for other purposes and earn its keep.

Pilots who experimented in night flying at Heston and Brooklands recently using this type of unit, remark enthusiastically on the ease of night landings by its help.

Boundary lights, obstruction lights, beacons, wind-indicators, ceiling lights are all supplied by Chance Brothers and Company Ltd. to specification.—F. D. B.




**AN UBIQUITOUS FLOODLIGHT.—The Chance utility landing floodlight which has been much in evidence at Heston and Brooklands lately.**

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# fly to success on BP SPECIAL

**King's Cup Air Race & Siddeley Trophy**
Miss Winifred Brown (Avian) - 1st
Flt./Lt. H. R. D. Waghorn (Bluebird) 3rd

**Hanworth Air Race**
Capt. Percival (Hendy 302) - - 1st

**International Air Race**
Miss W. Spooner (Moth) (general class) 4th
(heavy 'plane class) 1st

**Newcastle Air Pageant Handicap Race**
F/O H. H. Leech (Desoutter) - - 1st

**Bedford Air Pageant Handicap Race**
Mr. F. Gough (Avian) - - - 1st

**ALL ON BP SPECIAL**

For all standard light aeroplane engines, the New B P with its scientific blend combining lighter fractions, heavier hydrocarbons and high overall volatility is the ideal fuel. For special engines B P Special gets winning results. Do as experienced pilots do—fly on B P.

**WHAT B P DOES FOR OTHERS LET B P DO FOR YOU**




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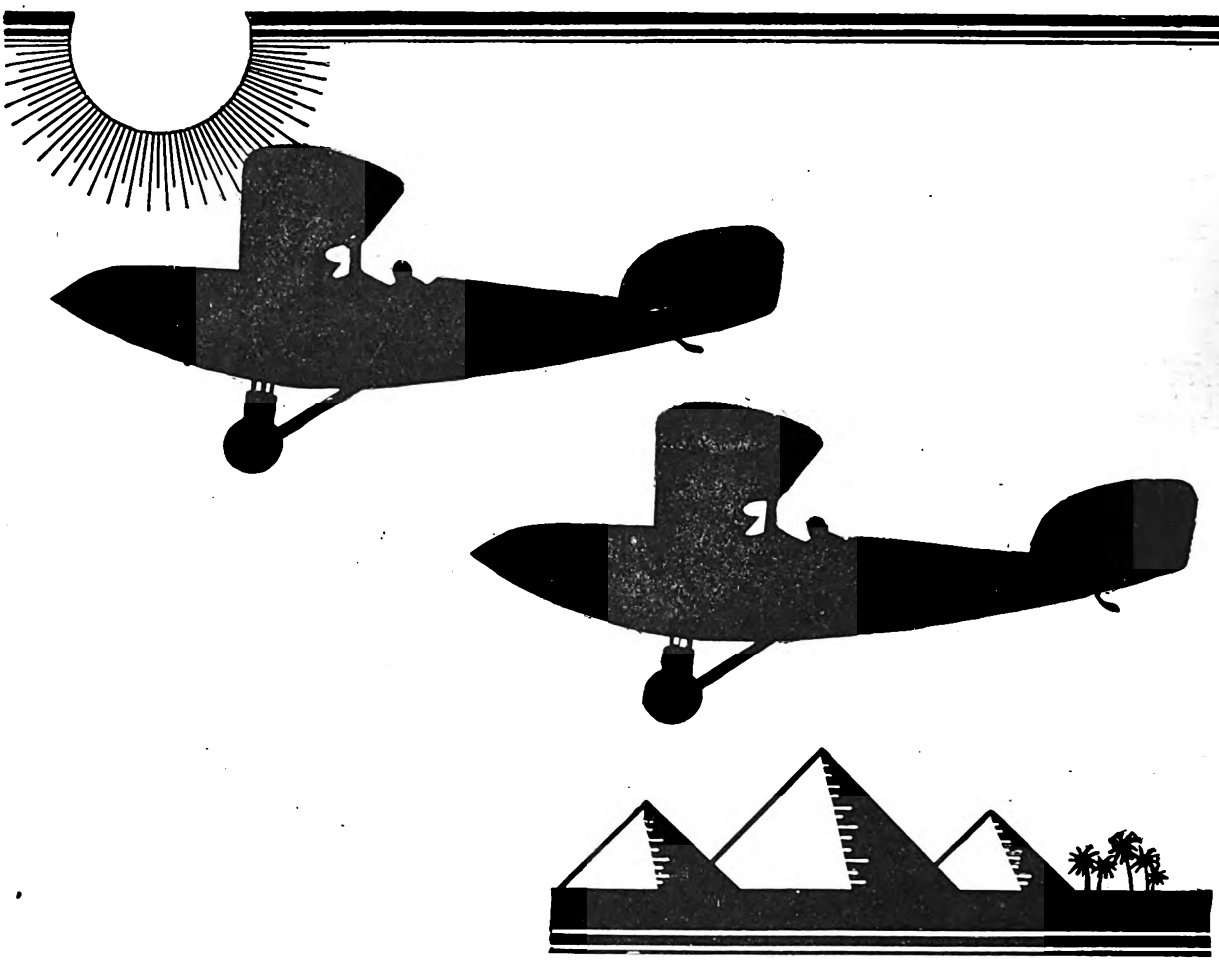

The elements in which they move are as real a potential danger to aircraft as engine trouble. The risk of blistering under a scorching sun is obviated when machines are doped with Cellon, which renders aircraft fabric proof against water, oil, petrol, and extremes of temperature. On all Fairey machines, which have themselves carried their fame all over the world, Cellon Dope is used for the fabric, while the metal structure is lacquered with Cerric.

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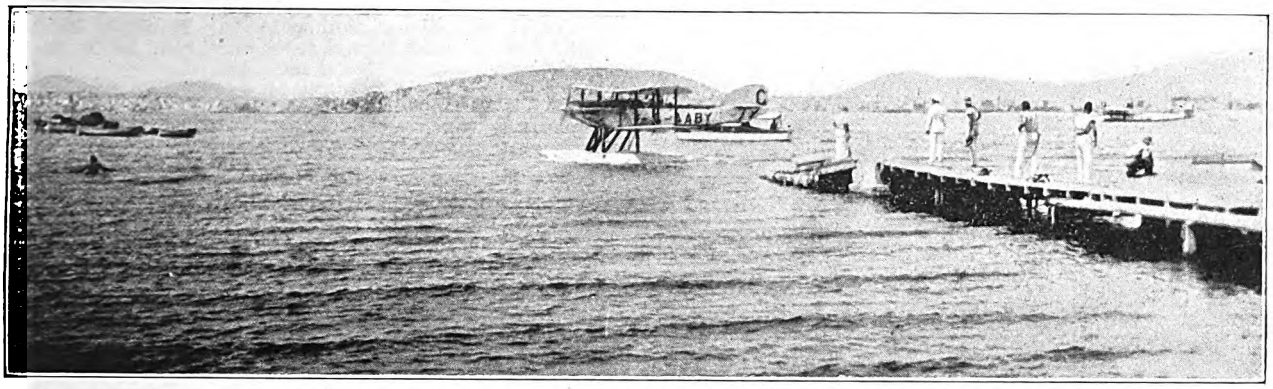
## FAIREYS IN GREECE.



**OVERSEAS TRADE.—A Fairey III.F (Napier) on floats being demonstrated by Mr. C. R. McMullin to the Greek Air Force at Phaleron Naval Base.**

In July, 1930, the Fairey Aviation Company decided to send a III.F Reconnaissance Biplane out to Greece to compete in a market that had very largely been in the hands of foreign aircraft manufacturers. The expedition was in charge of one of the firm's test pilots, Mr. McMullin, assisted by Mr. C. B. Baker, engineer.

This is Mr. McMullin's account of the expedition:—

On the flight out a stop was made at Brussels to allow the Belgian Authorities an opportunity to inspect the III.F. Much interest was shown, all the principal general officers commanding the Belgian Air Force were present and a very detailed description was given to them and a large group of other officers.

The next day, July 31, we flew from Brussels to Frankfurt-am-Main and refuelled, and thence to Vienna where we spent the night.

On Aug. 1 we flew from Vienna to Belgrad (3 hrs. 10 mins.). We landed at Belgrad at about 4 p.m. and stayed the whole of the next day to allow the Jugoslav Authorities to inspect the machine.

On the 2nd we flew from Belgrad to Salonika (3 hrs. 10 mins.), refuelled there and then directly on to Tatoi Aerodrome, Athens (2 hrs. 15 mins.) where we were met by Mr. Coutroubis,—the admirable agent in Greece of the Fairey Aviation Co. Ltd.

There were present at Tatoi several Military aircraft both reconnaissance and single-seater belonging to different nationalities and we appeared to be in for some pretty hot competition.

The first several days were devoted to a detailed inspection of the machines by the Greek Military Commission, which consisted of a non-technical general officer in charge, several technical officers of the Greek Army and a professor of mathematics at one of the Athens Universities.

Every detail in all machines was most closely examined and explained, and the construction of the III.F. was openly admired on all sides. We demonstrated the features of the III.F. in great detail and the serious interest that was shown on all sides was remarkable.

After this inspection was completed we began the flying demonstrations which embraced a climb, speed run, at various altitudes and a large number of general demonstration flights on some of which we carried Greek officers.

The weather conditions were very fine, but on most days there was a howling gale raging, and some of the bumps which one met round the mountains which surround the aerodrome, were truly remarkable. The wind also had a most disconcerting manner of changing round about 60 degrees of the compass in a space of a few minutes.

However, all went well and we finished our demonstrations on Aug. 17 with complete success and we found all the Greek officers of the Commission and the other officers at the Aerodrome most charming and helpful in all ways. Also they were very favourably impressed both by the construction and with the flying qualities of the III.F.

The next stage of our demonstration, namely, to transfer to a float undercarriage and give a seaplane demonstration, presented a very serious difficulty. The aerodrome at Tatoi lies about 25 miles from Phaleron the Naval Seaplane Station on the other side of the City of Athens, and over rather difficult and in some places rough roads.

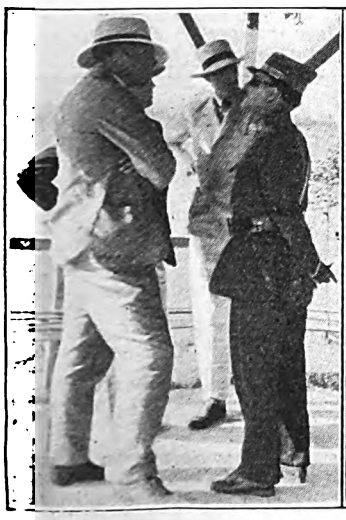
We searched for a field where we could land safely nearer to Phaleron, but did not feel inclined to chance an accident by landing in any that we could find. So we removed our wings and tail-plane and with the aid of an excellent crew of Greek sailors we managed to tow safely behind a lorry to the base. This was really a hair-raising trip, as the road wound round very steep corners, often with a sheer drop if we misjudged it. Also in many places the trees overhanging the road endangered our centre section.

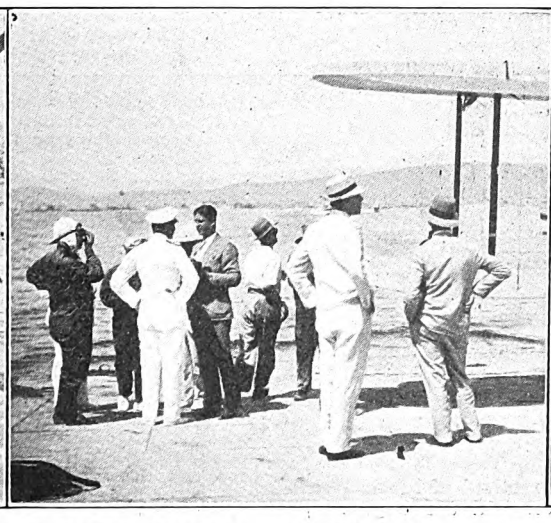
However, at the end of a very long day, on arrival at Phaleron every consideration was shown us and we were allotted a hangar and ample facilities. There Baker made the change-over from land to float under-carriage in, under the circumstances, record time.

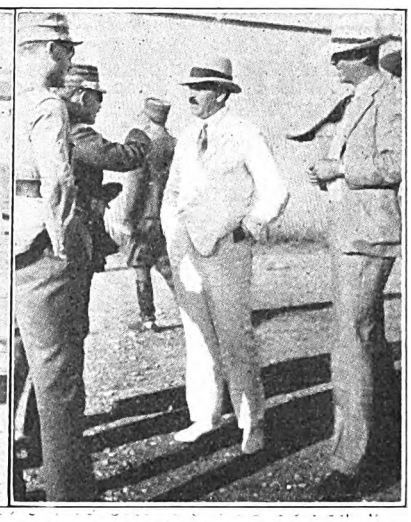
We spent the next several days in demonstrating to the Greek Naval Department and carrying officers and officials for demonstration flights.

One of our most interesting trips took us to the island of Hydra where the Chief of the Naval Air Force, Captain Voulgaris and his charming wife were staying with the President of the Greek Republic.

This was a flight of about thirty minutes and we picked up Captain and Mrs. Voulgaris and flew back with them.







**BUSINESS IS BUSINESS.—Left: The Greek General Officer Commanding and Mr. McMullin. Middle: At Phaleron, the British Chargé d'Affaires (Mr. Harvey), the Officer Commanding Greek Naval Aviation, and others. Right: The Greek General (left) discussing points with Mr. Coutroubis, the Fairey Agent.**

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**THROUGH THE FOREST.—The Fairey III.F on its pilgrimage.**

On this occasion Wing Commander Bentley Dacre, D.S.O., R.A.F., who has been lent as Advisor to the Greek Air Ministry, went with me, and I hereby apologise to him for making him get out on the wing in the boiling sun to start up the Napier Lion again after the embarkation.

We did a few more trips as a seaplane, and then the problem arose of getting back to Tatoi as a landplane again. We both felt that another long tow was absolutely more than we could bear, so we located a piece of ground behind the Greek aircraft factory, only a few hundred yards from the Naval base, arranged for a gang of sailors to push us over and took off without difficulty.

The Greek Naval pilots, who were quite impressed with the idea that a machine of this type could safely take-off in such a limited space, were, I rather think, at first afraid that I had taken on more than I could accomplish.

Thus, to get from Tatoi to Phaleron had taken us about 12 heartbreaking hours, to get back about 10 minutes.

Nothing remained but to pack our baggage, fill up with petrol, bid adieux to our good friends among the Greeks and British, and fly back to England by way of Uskub (2hrs. 55 mins.), Belgrad (2 hrs.), Vienna (2 hrs. 50 mins.), Nuremberg (2 hrs. 25 mins.) and Cologne (2 hrs.) to Croydon (2 hrs. 25 mins.).

Throughout the trip we had not the slightest trouble with either the aircraft or the Napier Lion XI. engine, and although it entailed a lot of hard work, Baker and myself enjoyed ourselves heartily.

## LUBRICATING OILS AND DETONATION.

The results of some experiments which were made to find out what was the effect of lubricating oil on the tendency of liquid fuels to detonate, have been published in R. and M. 1318 (which may be obtained from The Aeroplane Book Dept., Cannon House, Pilgrim Street, E.C.4, price 1s. 3d.).

As a result of these experiments Messrs. R. O. King and H. Moss, the authors of the R. and M., have come to the conclusion that the beneficial effect of iron and nickel carbonyls with respect to detonation is almost completely destroyed when the fuel contains as much as 12 per cent. of dissolved lubricating oil of any sort. When the fuel contains smaller proportions of oil, the deleterious effect varies with the nature of the oil. Mineral oil has the least, and oleic acid the most, effect.

Lubricating oils have a less deleterious action on ethyl fluid and benzole than on the iron and nickel carbonyls.

The applicability of these experimental results to practice depends on the extent to which the oil used by an engine is dispersed throughout the fuel-air mixture prior to combustion. Experiments show that this factor depends on the rate of oil consumption and the method of lubrication as well as on the nature of the oil and the engine speed.

## STEAM COOLING.

In view of the various full-scale experiments which have been made with steam-cooling in the Hawker Hart, the results of some wind tunnel tests published in R. and M. 1326 (obtainable from The Aeroplane Book Dept., Cannon House, Pilgrim Street, E.C.4, at 1s. 6d.) are of interest.

Perhaps the most interesting part of the experiments, and certainly the most promising were those made with steam-cooling and using a nose-tank along the leading edge. This tank extends backward to 24 per cent. and 14 per cent. of the chord on the upper and lower surfaces of the wing, R.A.F. 30 section, respectively.

The steam is directed along the nose-tank and particularly against its surfaces so that it condenses, collects in a channel at the bottom of the tank and runs back to the engine. The water runs back satisfactorily at small angles of dihedral and even at no angle of dihedral. At negative angles the results were not so good.

With this type of radiator the cooling per unit surface is about 60 per cent. greater than a wing-radiator using all the surface of the wing and using water in the ordinary way. The Drawing Office at the R.A.E. estimate that the weight of an aluminium condenser of the nose-tank steam-cooling type would weigh about .53 lbs. per sq. ft. of cooling area. This takes no account of the weight of the wing-covering and structure which is replaced by the radiator.

## A POINT TO BE WATCHED.

The Air Ministry in a Notice to Aircraft Owners and Ground Engineers draws attention to the fact that heating systems which depend on jacketted exhaust pipes may, under certain circumstances, develop leaks which will enable exhaust gases containing carbon monoxide to enter the cabin or cockpit.

Frequent examination of the exhaust pipes concerned should be made, particularly of the portions within the jacket or muff, to ensure that they are adequately gas tight.

After all, people who want to commit suicide can always achieve their object by imbibing CO in a garage without the risk of crashing an aeroplane with its asphyxiated occupant upon the innocent heads of those below.

## ONE OF THE COMING THINGS.

The oil engine, meaning chiefly the compression or non-electric ignition sort, with a less volatile fuel than petrol, is one of the hopes of aviation. Brant Aircraft, Ltd., the name of which is a portmanteau word derived from Mr. L. E. Baynes, managing director, and Mr. F. W. J. Grant, whose experience with Surrey Flying Services is long and varied, is now in business to try and realise this hope.

The company has been formed chiefly to produce an aeroplane round the Sidarblen compression-ignition oil engine. The designer of this motor is Mr. A. A. Sidney, who is another director of the Brant Company, and whose experience with oil engines was gained as manager and designer for William Beardmore and Company Ltd. And the name Sidarblen is likewise compounded of the names of Mr. Sidney and of those keen supporters of aeronautical progress, Lt.-Col. Ormonde Darby, and Lt.-Col. Barrett Lennard, who were the prime movers in the production of the famous Cirrus and Hermes engines.

Mr. Baynes is in charge of the aircraft design and was for some years on the design staff of Short Brothers Ltd., and later with the Blackburn and A.D.C. Companies.

Between them these pioneers of Civil Aviation should certainly be able to bring out an aircraft with the necessary practical and aerodynamic qualities for the Sidarblen engine, which is of a type that needs no recommendation. If successful it cannot fail to reward the work of its backers and do notable good to aviation at large.

## ASTONISHING FIGURES.

The following extract from a letter from a Canadian correspondent shows a highly satisfactory state of affairs:—

You will be interested to know that Maxwell's operations have been far more intensive this year than ever before, showing month by month greater activity.

During July their 14 Moth seaplanes flew 1,820 hours 15 minutes, which is in itself remarkable enough. But the forms which have just come in for August show 2,274 hours 35 minutes flying, which I consider really stupendous.

One of the pilots, Johnny Horne, operating from Orient Bay, flew 228 hours 25 minutes during the month. The average total flying time per machine for the month was 162 hours 28 minutes, or an average of 5 hours 14 minutes per day per machine. Horne's average was 7 hours 22 minutes, Sundays included, which is more than the average workman puts in.

Most of the machines flew practically every day and in fact three of them, flown by Carl Crossley at Biscotasing, George Phillip at Sault Ste. Marie, and Grant at Fort Francis did not miss a single day. Their times for the month are 165 hours 207 hours and 171 hours respectively.

The remarkable point is that all machines have been in constant use throughout the season, which commenced about May 1, and although these figures refer only to the month of August, similar shows were put up during May, June and July. Since May 1 Horne has done over 800 hours' flying in one machine to date.

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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### THE AERIAL BEAGLES.

On Saturday, Oct. 25, when the Second Annual Aerial Beagles Meet was held at Sywell, there was a distinct gale blowing, and it was very squally and gusty near the ground.

Quite a number of aerial visitors were expected, but by 2 p.m., when the Beagles were timed to meet on the aerodrome, only two machines had arrived. Mr. Brett from Norwich and Mr. Bentley from London; though Mr. Rambaut had flown from Brooklands for the week-end—as usual.

However, before dark, Messrs. Cubitt and Gough flew from Norwich (the former had Mr. Carrick, the well-known navigator, with him, which perhaps explains why he came via Bedford), and Mr. Watson, also came from London.

The Beagling was very good fun. There was no kill, perhaps because there were too many hares and too many people! However at times the pace was fast and furious—too furious for people who had not run since the meeting at Sywell last year.

Mr. Noel Lloyd and his Pipewell Beagles gave everyone a really good afternoon's exercise and amusement, and with better weather next year it is hoped more visiting pilots will be able to join in the fun.

The usual dinner and dance—this time held at Kettering—ended the day.

The Aerial Treasure Hunt advertised for Sunday, Oct. 26, was postponed. Owing to the shortened flying hours the pilots all said they must leave for home directly after lunch, and owing to the "night-before," few people arrived at the aerodrome before lunch time!

But at lunch time Sywell showed amazing signs of aerial activity for an October day. No fewer than twenty machines were on the aerodrome at the same time.

As if there had been some conspiracy or assignation, machines arrived from all parts, some pilots paying their first visit to Sywell. Before they left, Flt. Lt. Rose, in his red Avian, and Mr. Bentley, in the Moth IM, gave the Club members and roadside crowd wonderful exhibitions of flying.

The flying visitors were:—

Messrs. Bentley and Watson in Shell Moths (one a Puss). Messrs. Brett, Cubitt and Gough from Norwich. Mr. Downes-Shaw in a Moth from Bristol. Flt. Lt. Rose and his Avian. Mr. Wrigley in a Moth from Heston. Three Moths and a Puss-Moth from Leicester. Mr. Whittome's Moth from Peterborough.

The Northamptonshire Aero Club now has three club machines and seven private owners at Sywell, and one private owner at Peterboro! No so bad for a club which was only started in August, 1928, and didn't possess its first club machine until the spring of 1929.—M. O.

### HANDICAPS AT SINGAPORE.

One of the hardest working flying clubs in the World, at least in the tackling of great difficulties in their progress *ad astra*, is that of Singapore. Their flying times in July and August of 80 and 105 hours respectively are not at all bad considering that only two out of their three Moths are in operation and the other still awaits spares from England.

They themselves offer the exceedingly bad weather as excuse. In July all instruction was cancelled for days on end and only the best of the qualified members were allowed to take the air on the seaplanes. In August slightly more work was possible, and among the new soloists were Mr. Harvey, the club engineer, and Messrs. Smith and Lee. On the last day of that month the weather cleared and the two Moth seaplanes set up record times of seven and a half hours each.

Lectures have been given by the Club instructor on technical subjects with the idea of shortening the necessary hours of air instruction, or, conversely making the whole course more thorough.

The Club is severely hampered by lack of machines, especially in the fine weather intervals, when pupils are waiting to fly, instructors are available, and only lack of equipment prevents much larger flying times being recorded.

### A GOOD SWEDISH FLIGHT.

Recently Lieut. Marshall Lindholm flew from Stockholm to Tromso, in the north of Norway and 200 miles within the Arctic Circle, in a Gipsy Moth seaplane. He flew by way of Lindarangen, Sundsvall, Lulea and Narvik to Tromso, and covered the distance of 1,850 kilometres in 13 hrs. 45 mins. flying time.

The return flight to Stockholm was made in one day.

Tromso was left at 03.45 hours, and, omitting the stop at Narvik, Lieut. Lindholm flew direct to Lulea, across Scandinavia, from the Arctic Ocean to the Gulf of Bothnia. Thence he followed the east coast, stopping *en route* at Lulea and Sundsvall, and reached Stockholm at 18.30 hrs.

He covered the return journey of 1,790 kilometres in 10 hrs. 45 mins. flying time.

### AN ACCIDENT EXPLAINED.

The following letter and its appendix explain themselves:—

Berlin, S.W.29. 20th October, 1930.
Central Airport Tempelhof.

Dear Sirs,—As you will already have heard, Director Ebner, one of our most enthusiastic "Moth" pilots, met with a fatal air-accident here on Saturday.

The many rumours concerning the causes of the accident have also, no doubt, reached your ears.

We shall be obliged if you will kindly treat the enclosed report of the result of the inquiry into the accident as being of international interest, and publish it.

Thanking you, in anticipation, for your trouble.

Yours, etc.,
(Signed) Alfred Friedrich.

The Causes of the Fatal Accident to Director Ebner.

The result of the inquiry into the fatal accident to Director Ebner while flying a De Havilland Moth at the Staaken aerodrome on Saturday proves beyond doubt an error on the part of Herr Ebner who definitely strained the machine beyond its limits.

On Saturday, Ebner wished to carry out an aerobatic test. While executing the specified manœuvres, he was officially checked by expert observers who thus became eye-witnesses of the terrible mishap.

Among these witnesses were the chief of the Staaken air-police and an expert representative of the Deutsche Versuchsanstalt für Luftfahrt.

Each phase of this fateful flight was exactly observed through powerful glasses by these witnesses. Fear of impending mishap was already awakened at the beginning of the first loop. Instead of entering the loop slowly, Ebner entered it at over 200 kms. per hour, pulling the machine sharply upwards. He then dived, from the top of the loop with his engine running at full throttle. Having thus greatly increased his speed (which may safely be estimated at practically 300 kms. per hour) he again pulled the machine back sharply, thus creating a concentration of air-pressure.

In this way the machine was suddenly subjected to such excessive stress that the wing-spars were no longer able to withstand the pressure and had to break away. The wings did not break away *backwards* or *upwards* which might, in these circumstances, have suggested a flaw in construction or material. They actually folded together in a forward direction, which was conclusive evidence of the effect of banked-up air pressure.

When the wreckage was examined by expert authorities, all fittings and wing joints were found to be in perfect order.

The finding of the expert authorities reads as follows:—

"A typical 'A' case. The machine was subjected to an excessive strain such as *no* aeroplane would be capable of withstanding. The accident was entirely due to a mistake on the part of the pilot. It is proved beyond doubt that no fault in construction or material had any part in causing the mishap."

### DE HAVILLAND NOTICES TO AIRMEN.

Notice No. 2:—To Owners and Operators of Gipsy Engines II and III.

*Washers in Oil Systems of Gipsy Engines II and III.*—A new copper and asbestos type of washer has been evolved for use in the oiling systems of these two engines. Operators of these engines are strongly advised to fit them in place of the existing oval Hallite washers. These washers are for fitment at the flange joints where oil elbows are bolted to the pressure oil filter casing.

By quoting Part No. 1306-32.A, these washers will be supplied free of charge on application to the Service Manager, The De Havilland Aircraft Company Limited, Stag Lane Aerodrome, Edgware, Middlesex.

Notice No. 3:—To Owners and Operators of Puss-Moths.

*D.H. Puss-Moth Controls.*—Although the controls of the Puss-Moth are amply strong to deal with all ordinary loads, it has been found that one component does not possess the requisite strength factors for coping with cases of excessive loading produced by very severe application of the rudder while the aircraft is taxying. The part involved is the rudder cable rocking lever, Part No. H.30300.A, located just at the rear of the back of the cabin. It is therefore recommended that this lever be changed for one of new design, Part No. H.30300.A, modified, or H.33163.A.

The necessary parts and instructions can be obtained, free of charge, on application to the Service Manager of The De Havilland Aircraft Company Limited, Stag Lane Aerodrome, Edgware, Middlesex. It is understood that the Air Ministry is issuing a notice to ground engineers and owners concerning the above.

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# COMMERCIAL AERONAUTICS.

## AN UNOFFICIAL RECORD.

This week we have had another excellent example of what air transport can do when run as an air-mail proposition and not as a passenger-touring agency.

A letter from Freiherr F. von Boenigk of Goenoeng Rinteh, Medan, Sumatra, written on Oct. 17 and bearing the post-mark Medan 17.10.30 was delivered in this office by the first post on Oct. 27. Unfortunately, there was no Amsterdam post-mark to show exactly when it reached Holland.

Medan is in the island of Sumatra, a day's flying beyond Singapore,—which shows that a service organised for real mail-carrying can bring the Singapore letters here easily in nine days. This letter was brought on what one believes is the first return trip of the Netherlands air-mail run conjointly by the K.L.M. and the K.N.I.L.M. (the Koninklijke Luchtvaart Maatschappij and the Koninklijke Nederlandsch-Indische Luchtvaart Maatschappij).

Actually this flight was faster than any of the record flights between London and Singapore with the exception of Wing Commander Kingsford Smith's, and our friends of the Netherlands regard it as part of their ordinary mail service. Incidentally, the chief pilot of the machine was that Mr. van Dyk who in a moment of foolishness consented to fly the Atlantic. Happily he has been spared to do work which is more useful.—C. G. G.

## NAVIGATION CLASSES.

On the evening of Nov. 4 a series of classes in Navigation will begin at Gwydyr House, by kind permission of the Air Ministry, at 18.00 hours.

This course, which will continue throughout the Winter on Tuesday and Friday evenings, from 18.00 to 19.30 hours, will include all the subjects necessary for the Second-Class Navigator's Licence Examination, which will be held in March, 1931.

The lectures will be given by Capt. Entwistle and Mr. C. B. Collins and all equipment will be lent to students by the Air Ministry. The fee for the course is to be five guineas, and material or equipment taken away from the class will be subject to a deposit fee.

Only a limited number of applicants can be accepted, so those interested in getting a place should communicate at once with Capt. A. G. Lamplugh, the British Aviation Insurance Group, Ltd., 3/4, Lime Street, London, E.C.3. A cheque, crossed "Navigation Account," will ensure attention.

## MORE BUSINESS CALLING.

Señor Gabriel Badell, of the Spanish Ministry of Agriculture, is in London discussing a scheme for an aero-photographical survey of nearly half the total area of Spain.

Air survey is a noble science, and worthy of all encouragement, but the depressing feature of this project is that the finished maps are to be used as basis for a land tax. In America certain cities increased their revenue by many millions of dollars, thanks to hidden taxable areas discovered by the prying eye of the camera. And in Sarawak cultivated, and therefore taxable, areas have been discovered hidden in impenetrable forest. So doubtless Spain will profit.

## HIRE AND DRIVE YOURSELF.

The hiring out of motor cars to adequately licensed drivers is not a practice of long standing, and the equivalent process in respect of aeroplanes was hardly to be expected for a time. Clubs have adopted a practice very like it for cross-country work, but to Miss Winifred Spooner belongs the credit of being the first proprietor to advertise an aeroplane on a business basis for hourly or daily hire, with special arrangements for longer periods.

Pilots, of accredited standing and reasonably reliability, can hire Miss Spooner's Moth (Gipsy II) at reasonable rates plus insurance, as indicated in her advertisement.

## A HOMECOMING.

MM. Dieudonné Costes and Maurice Bellonte returned to Paris on Oct. 25 and were accorded a national welcome. They flew from Le Havre to Le Bourget in the *Question Mark*, for the most part through heavy rain which discouraged a large number of would-be spectators. The crowd which was present saw M. Laurent Eynac, Minister of Air, embrace the aviators and present them with bouquets.

They were chaired and carried to the gates of the airport by a cheering crowd.

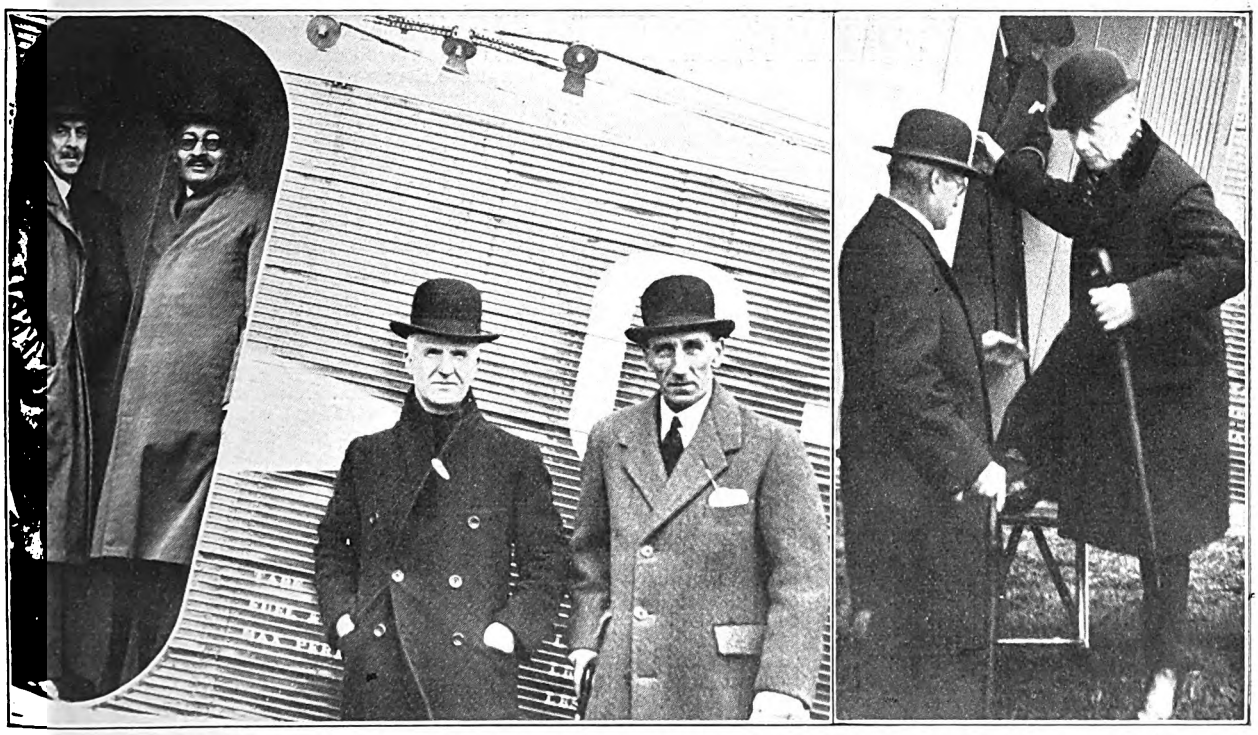
Among the military escort were seen some of the new all-metal Breguet two-seaters which have not previously appeared in public.

The heroes of the flight from Paris to New York then called on President Doumergue and drove in procession to the *Hotel de Ville* and the *Aéro Club de France*.

## NEWFOUNDLAND AIR MAIL SERVICE.

A claim has been widely published that the first air mail service has been established in Newfoundland and a contract concluded between the Government of that territory and the Newfoundland Airways. A mail route from St. Johns to the northern outlying district will be run by a Gipsy Moth with capacity for 300 lbs. of mail matter.

Those who have made the claim have evidently forgotten the mail services run tentatively some time about 1923-24 by Mr. Alan Butler and Mr. Sidney Cotton and Mr. H. Hemming between St. Johns and other points in Newfoundland, and to a port in Labrador. Aviation history moves so fast that six years ago is apparently pre-historic.



**A COMMERCIAL VISIT.—Left to right,—Brig.-Gen. Caddell with an Indian Potentate, Mr. Scullin (Australia) with Sir Robert McLean (Chairman of Vickers Aviation Ltd.), and Mr. Bertram with Lord Amulree, all investigating the Vickers Viastra during Saturday's display at Croydon.**

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## FORD AIRCRAFT IN DENMARK.

The following article has been translated from the Danish newspaper *The Dagens Nyheter* of Sept. 7. This makes the Saturday which is referred to in the text, Sept. 6.

FORD ORGANISES AIR LINES FOR DENMARK.
POST AND PASSENGER TRAFFIC WITHOUT STATE SUBSIDY.
EVENTUAL AIR LINE FRIEDRIKSHAVEN TO GOTHENBURG.

The Ford Motor Co. has on Saturday, through Dr. Rudolph Greulich, who for two years has been working to find a market for Ford aeroplanes in Europe, put forward a scheme to the Board of Directors of the Danish Post and Telegraph Office, in which scheme the company offer to run two regular Air Mail Routes from Copenhagen to Jylland (Jutland).

The company offer to plan and run these air lines without subsidy from the State, as they have the intention to run them on modern business principles.

The Ford Co. have already closed contracts with a number of firms who are especially interested in the possibilities of getting quick transport of goods between Copenhagen and the country. [That is the mainland.—ED.]

Also, the company goes another step further, and offers Air Mail Transport without any extra Air Mail cost.

The passenger traffic on the new route is not to be any dearer than the fare by steamer from Copenhagen to Ahus, or the railway from Copenhagen to Esbjerg! !

Further, the Ford Motor Co. plan to put up a European factory for assembling the aeroplanes in Copenhagen. This factory is then going to make land- and sea-planes with petrol- as well as Diesel-engines.

Besides the above-mentioned route to Jylland, Mr. Ford intends to organise another route through Jylland from north to south, with connections from Friedrikshaven to Gothenburg (Sweden).

## BUSINESS MEN AND THE AIR MAIL.

For years past much has been written in THE AEROPLANE about speeding up our Air Mail Services. The matter has at last been taken up by the London Chamber of Commerce, and the Executive Chamber, in support of the Aviation Section, have addressed letters, which appear below, to the Secretaries of the two Government Departments concerned.

To the Secretary, the General Post Office.

Sir,—On consideration of your letter of Aug. 8 last I was directed to say that the London Chamber is gratified with the assurance that the Postmaster-General is also of opinion that the full benefit of the high speed of air transmission can only be secured, so far as mails are concerned, when an extensive system of night air services is in operation, particularly within distances of about 1,000 miles from the starting point.

The Chamber has perused with interest the information contained in the Postmaster-General's letter regarding the poundage of air mail carried from Belgium and the amount of paid air mail from this country. It feels, however, that figures of air mail user to points so close as Belgium do in fact cast very little light on the probable user if services were established as is suggested to points some 1,000 miles distant.

It has to record its disappointment at being informed that all questions regarding the establishment and development of air services are primarily within the domain of the Air Ministry. As a matter of departmental convenience the Chamber has addressed its communications both to the Air Ministry and to the Postmaster-General. It fully appreciates that, in administrative and statutory matters concerning air, the Air Ministry is primarily responsible. It cannot, however, accept the view inherent in the Postmaster-General's letter that he is not primarily responsible for initiating and pursuing such plans within the structure of Government itself as will lead to the full value of the speed which the air can offer being placed at the disposal of commerce and industry for the carriage of mail.

The Chamber would regret to have to believe that, recognising as he does the manner in which the full value of air services might be utilised, it is not open to the Postmaster-General to take such steps as may be necessary to keep the mail services abreast of modern developments.

The Chamber notes with interest the Postmaster-General's comments on the small proportion of first-class letter matter carried by the Indian Mail. It has already had occasion to address communications to the Air Ministry and the Postmaster-General on the subject of the Indian air mail, and it cannot let the matter rest without pointing out that an air-mail service which does not take advantage of the speed which can be offered to the public and which runs only once a week cannot hope to attract more than a small and unimportant portion of the communications passing.

The Chamber would have more confidence that the possibilities of air transport were being brought to the notice of the competent authority if it had the assurance that the Postmaster-General was impressing upon the Air Ministry the relative unimportance of the existing British air mail services and was pressing for a much more frequent and rapid service, even at the expense of some contribution from his own department.

The Chamber would welcome discussion with the Postmaster-General upon the whole problem of the carriage of mails by air because it feels that, in this matter, Great Britain is falling far behind other nations, and that only a keen appreciation by the Postmaster-General of the possibilities of air transport, followed by resolute action on his part to bring its advantages within the reach of the foreign trade and commerce of Great Britain, is likely to lead to developments that a commercial community can regard with satisfaction.

The Chamber is entirely at the disposal of the Postmaster-General to meet him on any occasion which he may appoint, and it ventures to suggest that in view of the reference to the authority of the Air Ministry contained in his letter, it would advance this subject and be of value to all concerned if representatives of the Air Ministry were joined in that discussion.

(Signed) A. DE V. LEIGH, Secretary.

To the Secretary, the Air Ministry.

Sir,—I am directed to refer to your letter of June 16, in which you communicate the views of the Air Council upon the Civil Aviation Section's letter of May 15.

The London Chamber is gratified to observe that the Air Council agrees that this country should not be backward in the establishment and development of night air services, and notes with some regret the limiting factors which appear to operate.

The Chamber doubts, however, whether these considerations are, in fact, important. Its letter of May 15 dealt primarily with air mails within a radius of 1,000 miles from London, and it is evident that on the routes indicated the amount of night-flying, if any, in the British Isles must be of small account. The Chamber is aware of the facilities for night flying on the Continent, and believes that to enable British mail services, say from Croydon, to take full advantage of Continental facilities, a relatively insignificant expenditure on the part of the Air Ministry would be required.

It regrets to observe, in pursuing this subject of non-stop night mails, that the Air Ministry and the Postmaster-General are inclined to place the onus each upon the other. The London Chamber is not concerned with the demarcation of departmental authority, but it is deeply concerned with the fact that Great Britain is falling behind in the matter of the establishment of speedy air-mail services.

It therefore holds the view, which I am instructed to convey to you, that if there is in fact a division of authority in these matters, or if the onus of initiative in pursuing the quicker development of the quicker carriage of mails has not been defined, this is a matter for Government as a body to settle and should not serve to retard the modernisation of British Mail Services.

The Chamber has been informed by the Postmaster-General that he would be prepared to discuss this matter, and feels that such discussion must be unfruitful of results unless the Air Ministry is joined. It suggests, therefore, that, when the proposed discussion between the Postmaster-General and the London Chamber of Commerce takes place, it should be attended also by representatives of the Air Ministry, so that the representatives of Government, jointly or severally, may be in a position to deal with the issues which the London Chamber will then raise.

I am directed to state that the London Chamber is fully appreciative of all the Air Ministry has done in the matter of Civil Aviation, and recognises that some substantial progress has been made, but it is anxious that Great Britain should have the use of commercial machinery at least as efficient as that which is already possessed by its competitors. Moreover, it believes that satisfactory progress will not be made until the Post Office accepts financial responsibility for the provision of rapid air mail services to important commercial centres without regard to the poundage of mail that may travel by these services at the outset.

The Chamber has remarked with some concern the great advances in the carriage of mails by air which have been made by all the great industrial countries with which Great Britain is in competition, and it feels that the most interesting example of what has been done is to be found in the United States of America. There, so far back as 1925, a Committee of Congress, recognising the economic value of air mail laid upon the Postmaster-General the onus of organising services, and empowered him to make the necessary contracts. Moreover, after less than three years' experience of internal air mails, the Postmaster-General was empowered by Act of Congress to enter into contracts for the carriage by air of mail to foreign countries. In the result, regular air mail services have now placed the American manufacturer in rapid touch with all the valuable markets of South America.

The Chamber would be glad to hear if the Air Council would be prepared to participate in a round-table discussion of this subject.

Oct. 17, 1930. (Signed) A. DE V. LEIGH (Secretary).

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# CLAUDEL HOBSON
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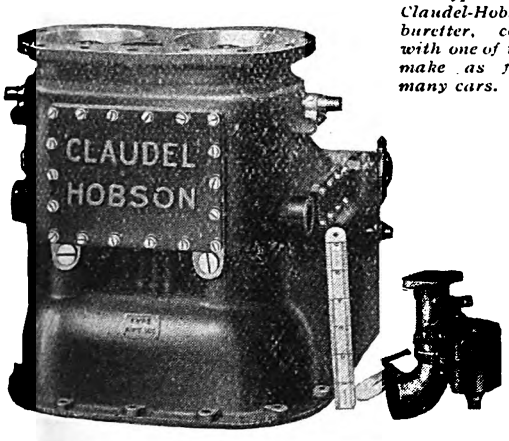


*Illustration showing the type A.V.T.100 Claudel-Hobson Carburetter, compared with one of the same make as fitted to many cars.*

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THERE is nothing "occasional" about the third seat of the Spartan three-seater. A high degree of comfort and roominess, as well as freedom from draught, is common to all three seats.

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An unbiased critic writing recently in a well-known aeronautical journal stated that the machine was "extremely comfortable to fly in . . . . it has a very good turn of speed indeed and there is ample room for the two passengers in the front cockpit . . . . In spite of the extra load the performance is even better than some two-seaters." He concluded by recommending "those clubs which indulge in a certain amount of joy-riding should find in the Spartan three-seater a machine to fill their needs admirably."

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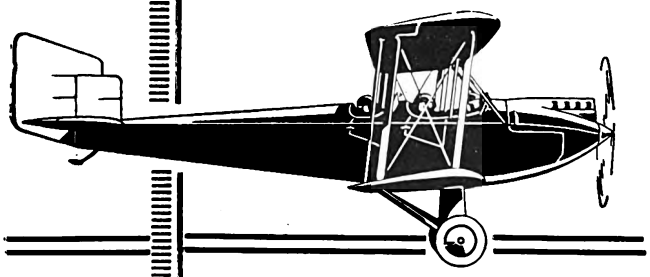

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# TRADE NEWS

## COMFORTABLE CONVERSATION.

Nobody knows better than does the student of flying in the dual-control stage that nothing is more likely to waste his money than unsatisfactory ear-phones. Conversation in open machines has always been a problem, and the new laryngaphone arrangement recently devised by Capt. Gerald Deane, A.M.I.C.E., late R.F.C., seems to be a really efficient solution.

Unlike most electric telephones, each individual set is quite self-contained, with only a small case containing an ordinary flashlight battery as an extra besides the equipped helmet. A single electric "flex" connects the head set with the battery, which slips into the coat pocket, and a "flex" from the battery ends in a universal plug which connects with any other set, or in fittings installed in the machine.

The three great features of the apparatus are the loudness of the telephone reception, the permanent and convenient positioning of the microphone, and the self-contained compactness of the whole.

The telephones have been given considerable extra loudness, which is very reasonable, as any person in an open aeroplane is, to all intents and purposes, deaf. The laryngaphone is not a new device. Some years ago it entered into a telephone apparatus designed for aeroplanes in which it picked up speech by contact with the throat.

As this involved some slight pressure on the throat it was frowned upon by the Medical Section of the Air Ministry, whose researches have proved that the harder a man's throat is squeezed the harder he finds it to get his breath at high altitudes. [Careful observers have noticed that in consequence safety belts are hardly ever fitted round the neck for inverted flying over 20,000 ft.—ED.]

Capt. Deane simply fitted the laryngaphone so that it lies close up to the corner of the mouth, where it works quite well and no sinister effects have yet been discovered. The provision of a cheap and efficient battery that takes up practically no room was the finishing touch. The whole set is made by the Telephone Manufacturing Company Ltd., who are the patentees. The batteries cost very little and will withstand more than eight hours of continuous chatter.

On a recent trial flight we found the device very satisfactory indeed, except for a few small matters which would normally be amended by the mere fact of ownership. We flew in helmets that were not our own, and whose owners had ears in slightly the wrong places. This not only militated against best acoustic results but also made the unadorned vulcanite rather hard in spots. Properly fitted, with the usual pads to soften the contacts and exclude outside noises, the set should prove a very decided boon for instruction and to the conversational private owner.

Even with the disadvantages recited above, conversation was perfectly easy and audible. All pitches of voice were tried, from a bass growl to the higher feminine register, without striking a really bad period. The engine was run at full-throttle throughout the tests. The speaker's own voice returns to his ears through a condenser circuit, which is an important advantage.

Leaning over into the slipstream one could still hear and be heard, provided the goggles were kept on. The latter were needed to maintain a good pressure on the ear-phones, especially without the powder-puffs which we usually use for our ear-pieces.

On the left side the microphone had to be held in place, but out on the right side the slip-stream pressure improved the contact rather than otherwise. For anyone on a job which involved exposure to the slip-stream some device extra to the wire-holder would be needed to keep the microphone in a good working position on the cheek.

No fittings were used, or needed, in the machine itself. The cords were merely passed across the cowling and plugged into each other. For a neater and more permanent installation the wiring would be simpler and cheaper than voice tubes, although the head-sets are naturally more costly than the simple metal discs.

In large machines the advantage should be very definite indeed. Distance, within the size of our largest machines, is no object. Also, plugs can be installed in strategic positions on the fuselage so that ground crews, or others, may talk comfortably to the occupants of a machine. Conversation always becomes most necessary when engines are being revved up and the take-off is imminent. And with this set the pilot of an Argosy running-up its engines could talk easily to officials on the ground while, as Kipling says, "persecuting his high and lofty vocation."

For the aerial equivalent of the sight-seeing 'bus, which is already with us, the telephone is practically a necessity. From personal experience one can testify to the immensely greater enjoyment of passengers, especially on first flights, who are told what is being done and are informed of the familiar landmarks over which they are passing unbeknownst. This could be done either by a loud speaker or individual head sets.

By way of making sure that the Deane Laryngaphone Arrangement was really practical, we smoked a cigarette before removing our helmets and took a quick one without any discomfort whatsoever.—F. D. B.

**THE COMPLEAT WRANGLER.—The Deane Laryngaphone arrangement is here shown entire. By connecting up with a similar plug in a second set, conversation, affable or otherwise, is possible under almost any handicap.**—(*"Aeroplane" photograph.*)

## ABOUT THE LIGHT ALLOYS.

The September number of *The Nickel Bulletin,* published every month by the Bureau of Information on Nickel of the Mond Nickel Co. Ltd., contains an extremely interesting article by Mr. W. C. Devereux, who is Managing Director of High Duty Alloys Ltd. The "R.R." alloys which are produced by this firm are well-known and took their share in keeping the Schneider Trophy in Great Britain.

In his article Mr. Devereux deals with the manufacture and application of the "Y" and "R.R." aluminium alloys. He gives detailed instructions for melting and casting. He also tells how to prepare the "hardeners" which are rich alloys of the various elements and aluminium. These "hardeners" contain the copper, nickel or titanium which are used to improve the qualities of the pure aluminium. The preparation of these "hardeners" calls for care as the melting point of their various constituents varies considerably, those of nickel and copper are for instance much higher than that of aluminium.

When he has covered the various aspects of melting and casting Mr. Devereux passes to the working properties of these alloys. He gives careful instructions for forging, for stamping, for extruding and rolling these materials. He quotes the working temperature for each operation.

Dealing with heat treatment, he makes the excellent point that distortion and cracking of castings can be overcome by using properly designed jigs for supporting the article when it is in the soft condition in the furnace until it is quenched. Such jigs also prevent the mishandling of castings by hooks and tongs.

Mr. Devereux publishes much information about machining these materials, he gives not only the correct feeds and speeds but also mentions the brand of lubricant.

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Readers of The Aeroplane will mostly be interested in one application of the material and that is to their own job. They will certainly find this article informative.

*The Nickel Bulletin* contains a mass of other information and can be obtained by mentioning The Aeroplane and writing to Mr. W. C. Devereux, c/o Bureau of Information on Nickel, The Mond Nickel Co. Ltd., Imperial Chemical House, Millbank, London, S.W.1.

**A FAMOUS FIRM OF PLYWOOD MANUFACTURERS.**

When timber was in general use for the construction of aircraft the London Plywood and Timber Co. Ltd., 384, Old Street, London, E.C.2, supplied a large proportion of the leading aircraft manufacturers with their requirements of silver spruce. Most of these firms have now gone over to metal construction, but the firm still supplies quantities of silver spruce to the firms which still build wooden aircraft.

The general procedure is for the London Plywood and Timber Co. to notify its clients of any consignment that comes forward and to give them the opportunity to get what they want through the selection of the client's inspector.

This firm also carries large stocks of plywood 1 mm., 1½ mm. and 2 mm. thick which are the general thicknesses used for aircraft construction. Although this material when used for commercial aircraft is only required to stand up to the Air Ministry tests for immersion and moisture content, the firm have had samples of this imported plywood tested to the full specification of the Air Ministry with excellent results.

The London Plywood and Timber Co. Ltd. have built a factory with all the latest and best equipment for the manufacture of plywood and they are now on the list of firms approved by the Air Ministry.

The firm makes a speciality of veneer and metal-faced plywood. They supply large quantities of the latter, which can be had in all thicknesses and with metal on one or both sides. Such metals as galvanised steel, aluminium, or, in fact, any other metal, can be used for this purpose.

**WHO WOULD HAVE THOUGHT IT?**

In The Aeroplane, of Oct. 1, 1930, on page 682, there appeared a picture of more than ordinary merit and quiet beauty. It portrayed Mr. F. Rodwell Banks, in a heavy-executive attitude, about to climb into an Avian Sports piloted by an easily recognisable Flt. Lt. Tom Rose.

For those who did not see the announcement in a more recent issue, Mr. Banks was at that time in the Technical Sales Department of Anglo-American Oil Co. Ltd., and has since become Technical European Representative of the Ethyl Gasoline Corporation, Inc.

In stating facts—as we thought—we appear to have omitted some important accomplishments of Mr. Banks which help to account for his rapid rise in the business world and acquisition by an American firm, as that country is unusually fond of snappy action.

The aforementioned picture appears—to less advantage, truly, but still appears—in the *Civil and Military Gazette* which is published in India. Beneath it appears the following information:—

The third Avro ordered by the Anglo-American Oil Company for the use of its sales staff. It is a sports machine with a Hermes engine. Standing by the machine is Mr. F. Banks, of the technical department, who made the first flight in the machine, and is capable of a speed of 125 miles an hour.

Even our high regard for Mr. Banks' business acumen and rapid up-take had never led us to credit him with such super-streamlined performance as this. We hope it is due to finesse ratio, but fear it may be partly accounted for by association with the notoriously fast *Miss Ethyl*.

**THE LATEST MOTH LITERATURE.**

The latest editions of the D.H. booklets on the D.H. Gipsy Engine and the D.H. Gipsy Moth are now available. As the result of the years of good service which D.H. aircraft and engines have given all over the World, the De Havilland Aircraft Company have been able to include in these booklets all the information which these years of experience have proved to be of value to the owner or operator.

Produced primarily for distribution with the aircraft and engines these booklets are quite instructive in themselves. They are well illustrated with drawings and photographs. The book on The Care and Maintenance of the Gipsy Engine also contains the latest instructions for the proper care and use of the Zenith carburetter and B.T.H. magnetos as fitted to the Gipsy engine.

The Rigging Instructions and Notes on the General Maintenance of the Gipsy are particularly informative to the student of practical flying. At the back of the book are drawings not only for rigging, maintenance, and lubrication, but also others which show how field repairs may be made to the wood or welded steel-tube fuselage and to the wings.

These booklets on the Gipsy engine and on the aeroplane are supplied as a matter of course to owners and operators. Ground engineers can get copies if their official activities and occupations justify their requests. Even the ordinary person can obtain them if he sends 2s. 6d. per copy.

While talking about this De Havilland Literature for the technically-minded, one may as well point out that the firm also produce publications for the public—especially for the public which is or will be buying light aeroplanes. The latest folder which describes The Puss Moth is a Royal Academy Show in itself, and may be had for the asking, post free.

The decorative effect of its component parts can be best seen when they are cut out and stuck on a black background as Selfridge's have done so effectively.

Enquiries should mention The Aeroplane and be addressed to the De Havilland Aircraft Company Ltd., Stag Lane Aerodrome, Edgware, Middlesex.

**THOSE SPARKING PLUGS.**

Considerable confusion has arisen over the particular breed of sparking plugs used by Wing-Commander Kingsford Smith in his flight to Australia. On what is usually most reliable authority, which had nothing to do with the firm itself, we were informed that a certain British make of plug was used. The makers of this plug promptly denied any knowledge of the fact.

After considerable investigation we have discovered that the machine started with some strange make of American plug, which apparently is unknown in this country, though Wing Cdr. Kingsford Smith has the agency for it in Australia. But, on the authority of the people who were looking after the final equipment of his machine before he started, we are able to state that he took with him in his locker sixteen K.L.G. Plugs,—so as to make quite sure of getting to Australia.

**STAG LANE NOTES.**

The voice of Sir Alan Cobham has been heard in Brighton, crying "Aerodromes in every down." So Brighton is to have its municipal aerodrome, and Mr. Miles of the Southern Aero Club, with Mr. Volk and Mr. Freeman-Thomas, the promoters, came up to Stag Lane to try a Puss-Moth. The site is to be the old R.F.C. aerodrome at Shoreham, adjacent to but much bigger than the present aerodrome. The intention is that this aerodrome shall serve Brighton, Worthing and Hove. The coastal railway, with a station at the boundary of the aerodrome, is shortly to be electrified and a ten-minute service operated.

The Earl of Lovelace, D.S.O., has bought a Puss-Moth to take out to Kenya next month. Although over 60 years of age, the Earl of Lovelace is taking flying lessons. He was at one time Adjutant to the 9th Lancers. Dr. Bury, another recent Puss-Moth owner, brought his machine in the other day for some minor attention. With very little experience of flying, and only two hours' practice in the Puss-Moth, he has just completed a successful and extensive tour of Europe. That very air-minded president of the Leicestershire Aero Club, Mr. Lindsay Everard, M.P., has taken delivery of his second Puss-Moth, and now owns two Puss Moths and a Gipsy Moth, known to Melton Mowbray as Fox, Vixen and Foxhound.

An important new offence has been added to the rules of the Stag Lane Rumble Club. This is known as "The Wuzzle," and consists of landing an amphibian aircraft on the aerodrome with the wheels *up* in the Summer or down in the Winter. (Penalty 2s. 6d.)

Captain de Havilland took up two district nurses for a flight in his Puss-Moth the other day. Both were sick, but by reciprocal district nursing both are now doing well. Out of eight district nurses who have flown with Captain de Havilland, six have been sick.

A special Flying School has now been started at Stag

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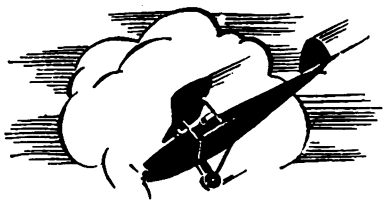

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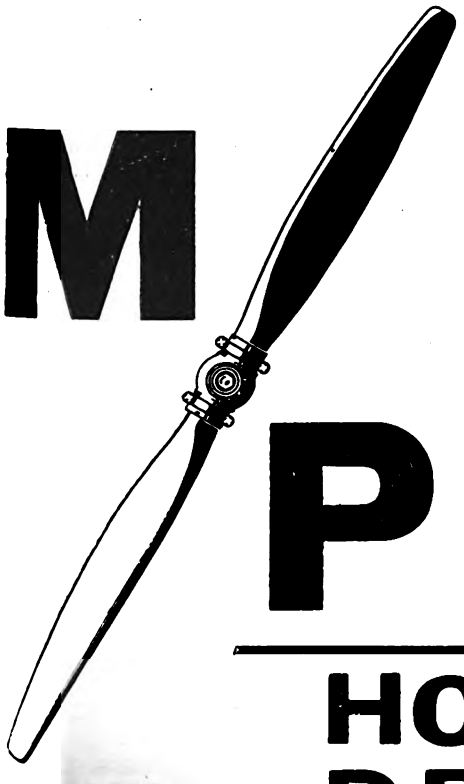

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Lane for students at the De Havilland Technical School. Fees have been fixed at £2 per flying hour, dual or solo, which compares favourably with most subsidised clubs.

Poignant scenes were witnessed the other day in the "hotel" (minus bedrooms, bathrooms and all usual offices except a great many rooms for drinking and one for eating and drinking), at which many of the highly-paid Stag Lane officials are in the habit of taking lunch. From a neighbouring room sudden screaming and shouting, punctuated by the crashes of overturned benches, rent the air. Many lunchers dropped their glasses. Strained glance met affrighted stare. This could be no other than a second shareholders' meeting of a gigantic flying concern, and a fevered search for share certificates began. But no! The collapse of the partitioning wall revealed only a battle with hatpins between two tremendously delirous lady customers in the public bar. But the language was certainly that of a creditors' meeting.—O. W. H. C.

## MANY INVENTIONS.

If our early Biblical studies have not become unduly confused by later bibulous studies we shall remember the story of the Nabob's Vineyard, where the Queen of Sheba was wont to take her early-morning tub in the seclusion of the vines (hence her side name Bath-Sheba, not to be confused with Beer Sheba, the lady who kept the tavern opposite) until flung out by Nebuchadnezzar,—a monarch living largely on grape pips, who desired the vineyard as a grazing ground. Neb afterwards sent Uriah the Hittite into the Air Force, but that is another story.

This ancient story was closely paralleled on Saturday last when, in honour of certain Empire Delegates, Croydon Aerodrome was turned into a Nabob's Vineyard, even to the detail of browsage, for such as felt that way inclined, which was tastefully arranged round the supporting pillars of the Main Hall in the shape of assorted potted herbage, including numerous specimens of the lethal aspidistra. This arrangement had two ulterior motives, one of which was to conceal the ominous cracks in the pillars, while the other was to prevent portly personages from leaning against them and bringing the place down round their ears.

As in the Scripture story, ladies were carefully excluded from Saturday's beano, the only exception being the Ministerial Miss Bondfield and a notable lady member of The Aeroplane staff—the latter was escorted by Mr. Geoffrey Dorman, now of *Airways*.

The Government gave a lunch, at which we determined to eat and drink heavily in order to get a rebate in kind on (or off?) our Income Tax, but we shortly became convinced that our particular waiter was an income-tax collector, thinly disguised in side-whiskers and a soiled shirt, for no sooner did we become interested in any course than he snatched our plate away. Finally he left us with a knob of cheese in one hand and a stick of celery in the other and no plate to put them on, just as the King's health was proposed. Thus armed, we had no alternative but to present arms as smartly as possible with the celery, no mean feat with a bit of cheese balanced on the muzzle of that weapon.

Guests were advised to wear informal costume suitable to the exposed conditions of Croydon Aerodrome, and those who had woolly overcoats wore them proudly (smelling strongly of camphor), whilst others said they were Nordics and did not mind the c-c-cold. The Prime Minister came in a pair of plus fours cut with Gaelic economy, and our genial friend, Mr. Montague, sported a gleaming top-hat, while one gentleman, who came early and was mistaken by many for the new S of S for Air, wore evening dress and miniature medals. He it was who asked *who* The Tarmac was, and it afterwards transpired that he was the official announcer and toastmaster, who is, of course, accustomed to weird and exotic titles. There is a hint in this for the first Civil Aviation Peer—How about Lord McTar of Tarmac?

The Air Force Display will be described elsewhere, and it is sufficient to say here that it was well organised and faultlessly performed. The Civil side was so arranged by Major Richard, Chief Aerodrome Officer, that everything went without a hitch, which is saying a great deal, and a word of praise is due to the Traffic Officers in the Control Tower, whose job on these occasions is an arduous and anxious one. Our only criticism of the whole show is that immediately after an excellent lunch it is scarcely tactful to let those ribald kites, the Gugnuc, Pterodactyl and Autogiro, gave their celebrated impersonation of three gentlemen of the old school leaving Romano's after a celebration dinner.

Croydon Aerodrome was glad to welcome Lord Amulree, who, under the energetic guidance of Mr. Bertram, was here, there and everywhere, taking the greatest interest in everything he saw. Lieut.-Colonel Shelmerdine, home on leave from India, was at Croydon also, and we trust the warmth of his welcome from Civil Aviation people, with whom he has always been a popular figure, did something to counteract the chill of the coldest spot in England, the Croydon Tarmac.

In a recent *Times* advertisement a gentleman, describing himself as a University blue, threw out a quaint challenge to the monied classes by inviting them to show their faith in their own judgment (not his) by financing him in a hitherto unattempted long-distance flight. We did not think there were any long-distance flights which had not been attempted, but we suppose if there are a certain tone would be added to them if flown with an Oxford manner or a Cambridge accent and all the glamour of (say) a Miniature Golf Blue.

It is amusing in these days of excitement about record flights to hear that whilst jogging along with a load of mail from Batavia to Amsterdam in a standard K.L.M. commercial machine on the regular scheduled mail service between Holland and the Dutch Colonies Messrs. van Dyk and Wiersma did the trip in eight and a half days via Cairo and Athens (owing to the prevailing Turkish delight in obstructing aviation), and whilst this speed will not, of course, be kept up normally, it seems to show that the twelve days allowed for this journey will make it too leisurely a business for the average K.L.M. pilot.

The Desoutter Aircraft Co. had the task of converting the Columbia from a flying tanker into a cabin machine, and did so after a two-day struggle to remove the 450-gallon aluminium tank which filled the whole fuselage.

On the third day the cabin was lined with moquette, internal decorations were completed, and a panel was placed on the fuselage bearing the wonderful flying record of this machine. It is understood that Messrs. Boyd and O'Connor will fly in her round Europe on a demonstration tour, the main object of which is to advertise Personal Flying Service, the firm to which the machine belongs. Clever advertising.

Certain young friends of the Editor evidently disagree with most commercial pilots about the efficiency of the Meteorological Service. Even if they think it advisable to look a gift horse in the mouth, it is well for them to remember that if the Croydon Met. Office were not a silent service like the Control Tower, both these could unfold many a tale of young amateur pilots who, designing to fly to Heston, have drifted sideways to places like Hooton, thereafter bitterly blaming the weather reports, or the course given them by the Control Tower. Ah well—Youth will out!—SPRY.

## PERSONAL NOTICES.

### Death.

WHITTOME.—On Oct. 22, at Halton, the result of an aeroplane accident, Thomas Eustace Whittome, Flt. Off., R.A.F., youngest son of the late John Whittome and Mrs. L. Whittome, of Stanford House, Brighton.

Mr. Whittome entered the R.A.F. with a short-service commission in November 1928 and, after a course of flying training at No. 4 F.T.S., Abu Sueir, Egypt, he was posted to No. 1 School of Technical Training (Apprentices), Halton. He was not flying on duty or in a Service machine at the time of the accident.

### Marriage.

STOKES—STEVENS.—On Oct. 22, at Epping, Leonard Rendall Stokes, R.A.F., to Barbara Stevens.

### Forthcoming Marriage.

WISE—FLETCHER.—A marriage has been arranged, and will take place on Nov. 18, between Wing Cdr. P. K. Wise, C.M.G., D.S.O., of Gorse House, Rugby, and Esmée Lyonelle, elder daughter of Sir Lionel and Lady Fletcher, of 26, Prince's Gardens, S.W.7.

### Births.

CHAMPION DE CRESPIGNY.—On Sept. 26, at Srinagar, to Sylvia, wife of Wing Cdr. H. V. Champion de Crespigny, M.C., D.F.C., R.A.F., Risalpur—a son (Anthony Richard).

DAVID.—On Oct. 24, at 27, Ferncroft Avenue, Hampstead, N.W.3, to Geraldine (*née* Mackenzie), wife of Flt. Lt. E. H. M. David, R.A.F.—a daughter.

MORETON.—On 23, at Chalklands, Ford, Salisbury, to Betty (*née* Slade), wife of Flt. Lt. N. V. Moreton—a daughter.

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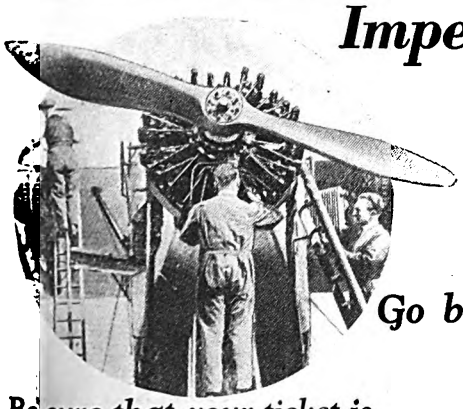

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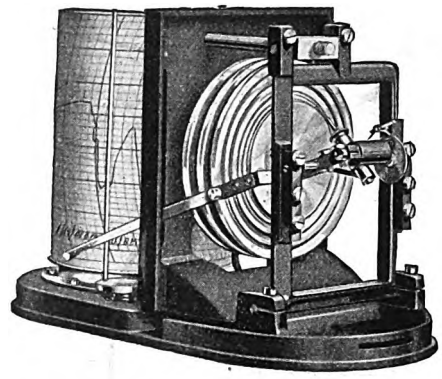

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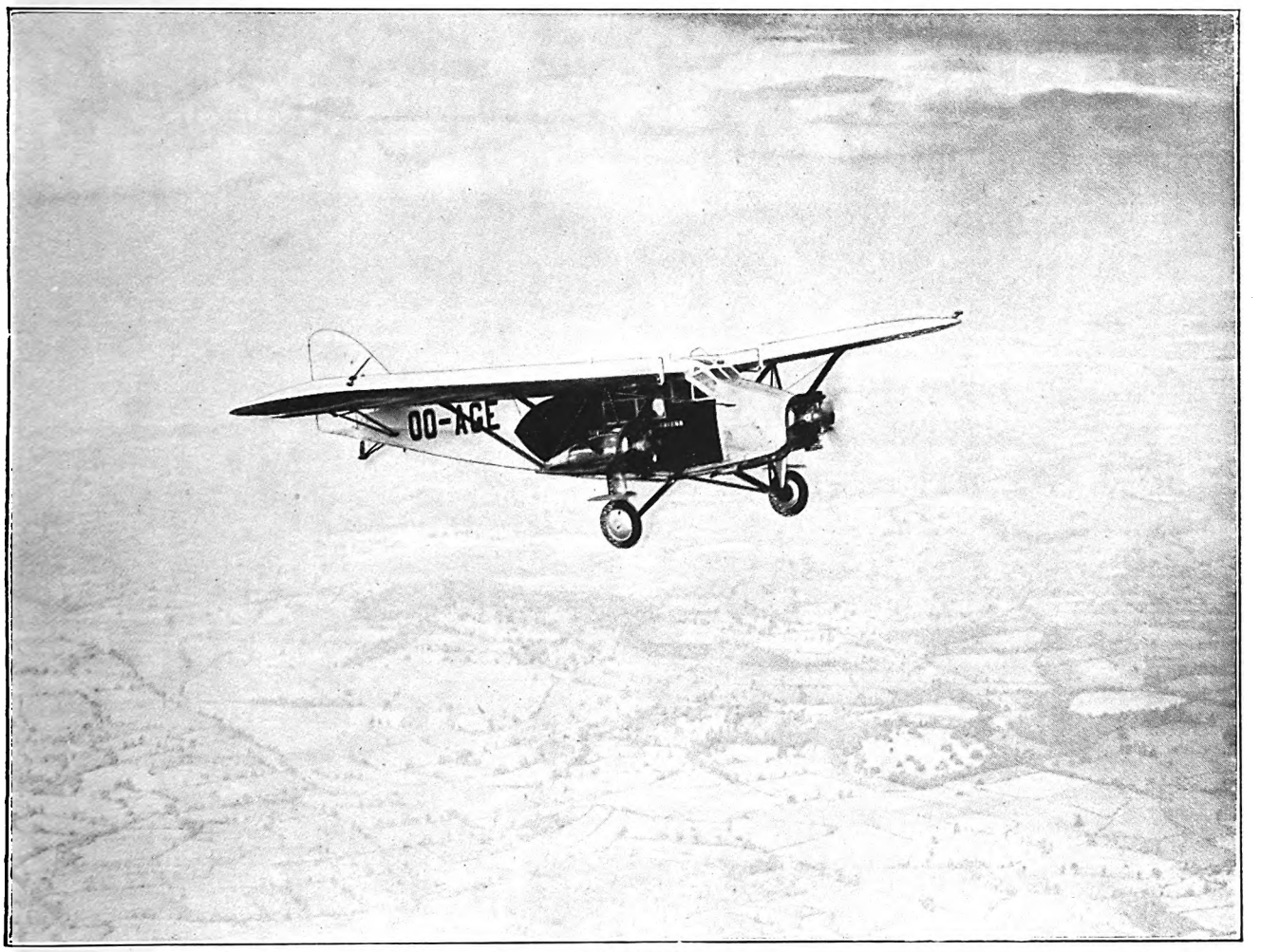


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Vol. XXXIX. No. 19.

# THE AEROPLANE

6d.
Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by
C.G.Grey

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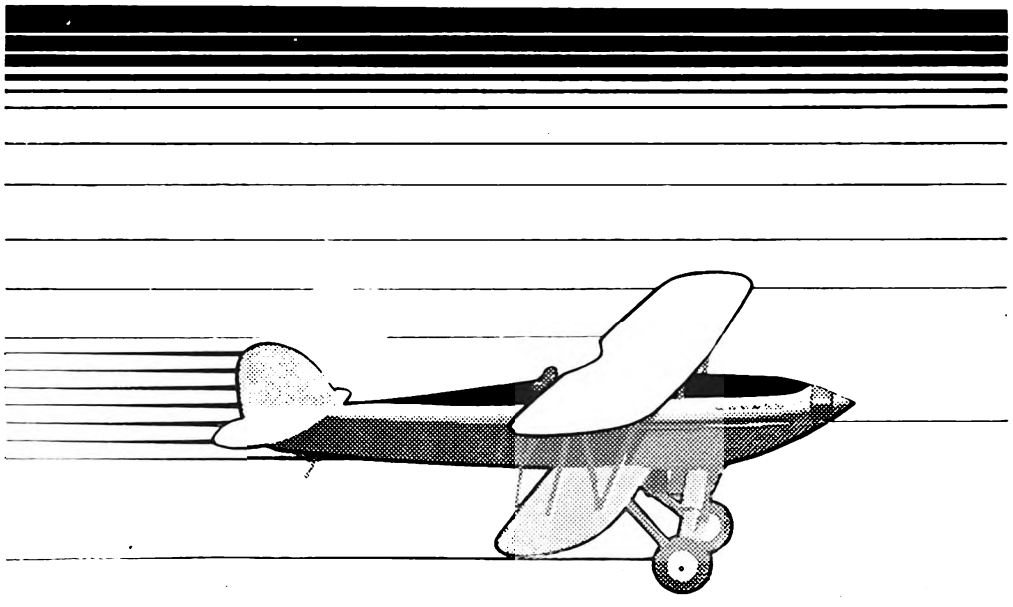

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# THE AEROPLANE

Incorporating

Aeronautical Engineering

VOL. XXXIX

No. 19.

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## ON THE LIGHTER SIDE OF SCIENCE—II.

### Height or Altitude?

That story which was told last week of the argument on swinging compasses reminds me of another argument in which several eminent scientists differed. We were discussing Height Records. Certain scientists, with their usual love of misused Latin, argued that they ought to be called Altitude Records. Another and greater scientist protested that the word might be misunderstood by astronomers, who measure the altitude of a star by an angle,—I don't know what lines make the angle, but that is what he said.

Whereupon a misguided practical man asked innocently whether, when the prelates of the Holy Roman Church prayed to *Pater Noster in altissimo cœlo* they meant that Heaven was at a height or at an angle? The idea of a Heaven on a permanent slope was too much even for the eminent scientist. But personally I prefer the good old Germanic *hoch* and its derivative height.

### Daring and Dope.

Even the best of applied scientists may make a mistake once in a while. And as we so seldom have a chance of telling a story against that highly efficient body the R.A.F. Medical Service this cannot be let pass.

Not long ago an aeroplane crashed at an R.A.F. aerodrome. As usual, everybody within reach rushed to pull the victims out of the wreck. The first to reach it was an energetic aircraftman, armed with wire-cutters, who burrowed into the fuselage and proceeded to cut his way in towards the imprisoned crew.

Within a few minutes an equally energetic Medical Officer also arrived,—armed with the tools of his trade. Seeing part of a struggling figure in R.A.F. uniform protruding from the wreckage he promptly drew his hypodermic syringe, jabbed it into the latter end of the apparent victim, and administered a hearty shot of dope to quiet his struggles and make easier his extrication from the tangle of wires and struts.

When the ambulance arrived the men could not make out why they had to take to hospital one more casualty than the known crew of the machine. And unfortunately there is no record of the feelings of the gallant rescuer when he felt himself fading out, after what probably felt like a sharp prick from a broken wire, nor is there any record of what he said when he woke up in hospital.

### The New Ju-Ju.

The hostility between the practical man and the scientist is as old and as new as the war between Jubal and Tubal Cain, of which Rudyard Kipling has sung as only he can. The practical man always has the best of the argument, but the scientist survives because the vast majority of people are neither practical engineers nor scientists, and so regard the scientist as being some species of Big Medecine Man. In fact, in these days in which defective business management and lack of great leaders have caused a decline of public interest in both Religion and Politics, the Scientist, with a capital S, is taking the place which was once held by the Priest and the Statesman. His is a new form of Ju-Ju, or Joss, or Totem, or Priestcraft, and he is regarded accordingly.

So just by way of iconoclasm I give hereafter the views of an old Sergeant in the Royal Canadian Mounted Police.

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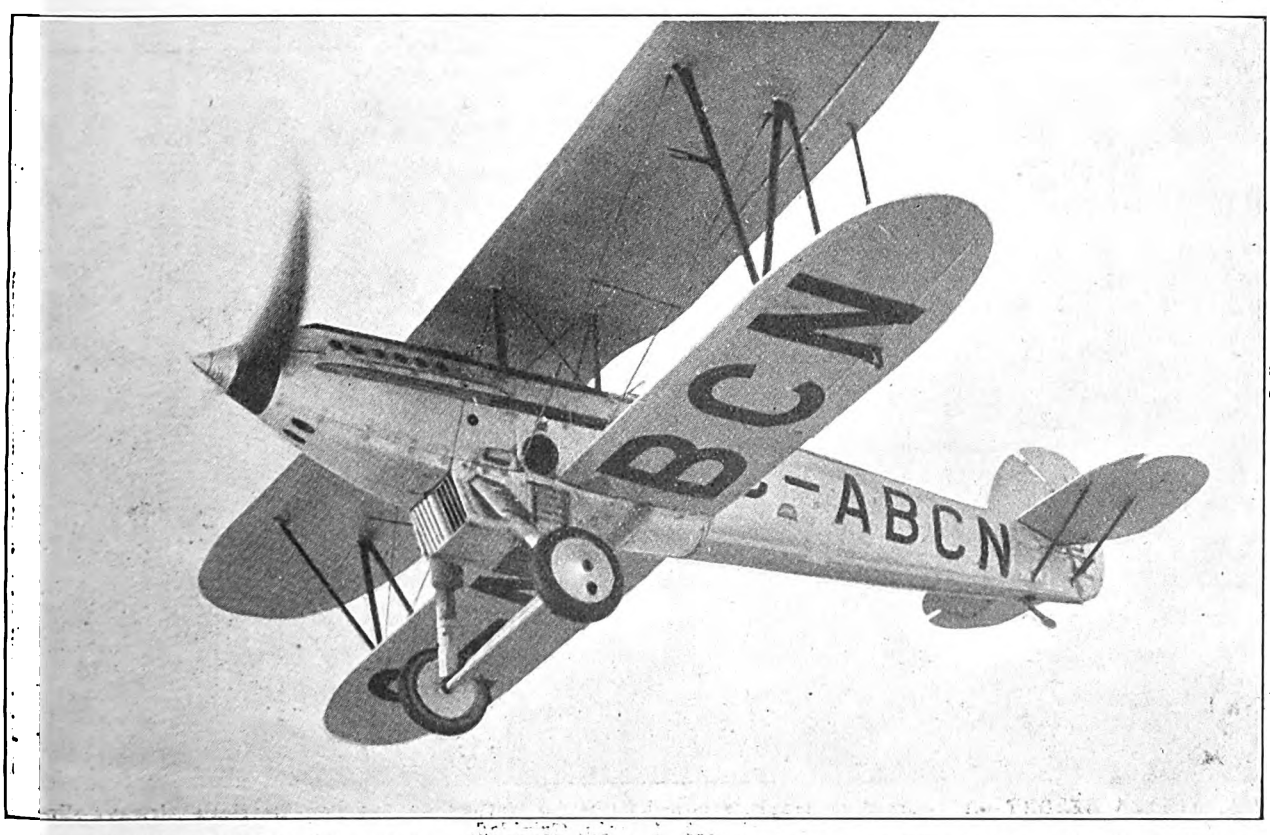
**"SUCH EASY GREATNESS, SUCH A GRACEFUL PORT,**
**"SO TURNED AND FINISHED FOR THE CAMP OR COURT."**

(Addison—*Campaign.*)




**ABOVE THE CLOUDS.—The Fairey Firefly (Rolls-Royce "F" engine) piloted by Mr. C. S. Staniland photographed from a Fairey III.F above the clouds.** —("*Aeroplane*" *photograph.*)

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which were sent to me recently by my valued correspondent in Chicago, whose informative and amazingly humorous letters have done so much to enliven this paper. Here is what the man from Chicago has to say:—

A Practical Man on Scientists.

There's a famous character down "North of the height of land"—a Sergeant of Mounted Police who had grown gray in the Service, when it was still the R.N.W.M.P.—whose pet aversion is scientists.

"I've seen 'em work—was detailed with 'em one year," he says. "Fifteen, sixteen of 'em seining minnows, countin' the scales on white fish to find out how old they was! Who gives a damn how old a fish is so he's big enough to eat?

"Who gives a damn how many quills a porcupine's got, or what time a year a pike's teeth come loose? And who gives a damn whether some little plant you see is a *bohunkus gazookus,* or a *rinopinkus hilarium,* an' how far north it grows, or don't grow, an' why?

"There ain't a plant, nor animal, nor fish, nor tree, but what they call it out of its right name. It's like listening to a bunch of Doukhobors. Take that tree over there—you an' me know damn well it's a spruce, but it ain't, according to them. It's a *picea canadensis*—I remembered that one.

"An' when they ain't inventin' nicknames for everything they see, they're off peckin' at rocks, or clawin' in the mud, or countin' the bugs in a bird's craw. I'm askin' you, who gives a damn if a woodpecker eats pinch-bugs, an' how many he eats to a meal? Or if a pelican swallers a fish head first, or hind end first? They call it Science! Science, Hell!

"They can tell you how far a snail can walk backwards on the third of July in latitude 58°21′ an' longitude 110° at an altitude of 2,147 feet with the thermometer at 59° above zero an' a humidity of 76 an' the barometer readin' 29.2, allowing for a compass variation of 14°, if it's partly cloudy, an' the moon's in the third quarter—any one of 'em can tell you that without battin' an eye. But I'll be damned if more than half of 'em can go to the spring for a pail of water an' get back without a policeman!

"I had my bellyfull of wet nursin' em'. They can tell how many nits a louse lays, an' how long it takes to hatch 'em but they scratch all summer 'cause they don't know enough to boil their shirts when they get lousy!

"They can pickle a straddle-bug in alcohol and tell you the name of it's grand-mother, but they couldn't fry 'em a meal of victuals if they was starvin'. It's understandin' people, an' knowing how to get around through a country that counts—not knowin' how many hairs a spider's got on his right hind ankle. I'd rather put in a month runnin' down a good hooch runner than ten minutes figurin' why a deer's got horns instead of wings, and why a muskrat's got neither.

"I heard 'em argue half the night about the family history of a chunk of shell one of 'em split out of a rock that had laid there a couple of million years or so, an' a storm come up, and they all went in the tent an' left their blankets layin' beside the fire. I laid there in my sleepin' bag an' snickered. An' by an' by, when they'd got to where they wasn't no more than a hundred thousand years apart on the age of the shell, they got sleepy—an' was surprised as Hell to find out that rain would wet their blankets. Next day I took pity on 'em an' dried their blankets, or they'd be wet yet.

"They talk about the good they do mappin' the country and findin' out all about mineral and timber wealth! Hell! They don't change nothin' do they? It'd still be there just the same without 'em, wouldn't it? The prospectors would find the mineral wealth, an' any one that comes through can find the timber. But they waste most of their time countin' the ridges on fish scales through a microscope, or tryin' to figure which end of an owl the hoot comes out of!"

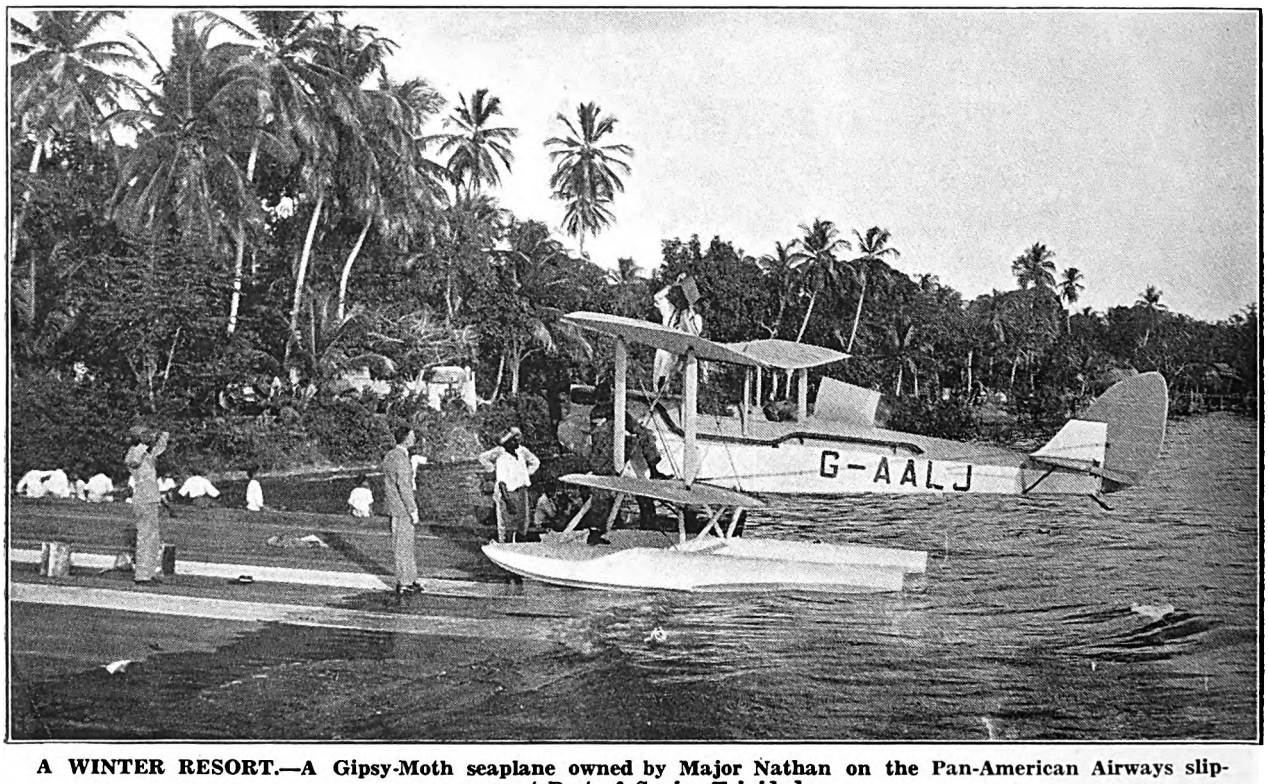
One of your weekly illustrated papers the other day, by the way, referred to the mounted police as "mounties," a term they particularly dislike. As a friend of mine once said, "I'd as soon think of calling the Supreme Being 'Goddee'."

The hero of that story of the Royal Canadian Mounted Police (full name) is an old timer whom I have met on two or three occasions. Once at The Pas, once when we were fellow-passengers in the baggage car of the Muskeg Express, and once up in the Barren Lands. I have heard him say enough along similar lines to fill several volumes, and he has been extensively fictionised and quoted by several different writers. The foregoing stuff is quoted from memory, but in piecing it out I can't say what parts came direct from the sergeant, and what parts came indirectly through reading fiction in which I recognised him. In any event the particular wording cannot be copyrighted.

I might explain that the Muskeg Express was a combination freight and passenger train which left The Pas once a week and wandered northward for 500 miles to Fort Churchill, tying up of nights and travelling only by day, at the mean speed of 10 miles an hour. Passenger accommodation is confined to tourist coaches full of rough-neck railroad labourers, so the gentry travel as guests of the baggage-master, who has several two-storey iron cots in his car, as well as a stove to heat the water for the hot toddy, and a safe to hide the rum in until after the "Mounted" has searched the train at the Saskatchewan river, across which no liquor is supposed to travel. You bring your own eider-down sleeping bag, and rustle your own food, with the exception of hot coffee, which is supplied by the train butcher.

Our Own Scientists.

So much for the combined Canadian and Chicagoan opinion of scientists. It is perhaps an extreme view, but it is only the other end of the scale from the modern tendency




**A WINTER RESORT.—A Gipsy-Moth seaplane owned by Major Nathan on the Pan-American Airways slipway at Port of Spain, Trinidad.**

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to regard anything which is claimed by anyone who can write B.Sc. after his or her name, as being rather more true than the Synoptic Gospels or the writings of that eminent sportsman and gentleman, St. Paul the Apostle. Between the two extremes comes the real science (that is to say knowledge) of the practical engineer.

A Matter of Aspirates.

Those who like arguments on the use of the English language, especially in connection with the use of Anglicised Latin and Greek, can always find plenty of material in any technical article.

Elsewhere in this issue a technical writer refers to "naturally aspirated engines" to distinguish them from supercharged engines. Perhaps some of our scientists will decide for us whether we should call these non-supercharged engines "hengines" or "'engines." Which is the natural aspirate?

But surely, using the word in the medical sense, we should say "engines which aspirate naturally." One does not say of a puffing old gentleman that he is a "heavily breathed old buffer," we merely say that he is "breathing heavily." And, anyhow, surely *in*spiration would be a better word than *as*piration.

Scientists are apt to be very careless in their uses of the active and passive, and of the transitive and intransitive. They are nearly as bad as journalists and the writers of the sub-titles on the movies,—but, of course, they also are scientists in their way, especially in the way of that little knowledge which is a dangerous thing.—C. G. G.

## SOVIET AVIATION FORGES AHEAD.

The following notes are taken from *The Moscow News*, a paper which is published in English, presumably for the benefit of American and English technicians employed in the U.S.S.R.:—

In the third year of the Five-Year Plan the total length of Soviet air-lines will be 26,000 kilometres, which is almost the same as the air-lines of Germany and France.

Mass production of the big three-motor airplanes, the type of *Wings of the Soviet* and *Land of Soviets* will be greatly increased. Many new lines are to be opened, including a line Moscow—Welen, which will be the longest line in the World, 13,000 kilometres, about twice the length of the London—India line.

An 8,000-kilometre trans-Asiatic line is also planned; trial flights have already been made over the lines Irkutsk—Habarovsk and Habarovsk—Vladivostok. A new line, Irkutsk—Aldan opens on Dec. 1; for this Polar line aerodromes were built in very hard conditions on the frozen "taiga."

The island of Saghalien will be connected with the mainland at Habarovsk by two new lines, one from Oha and one from Alexandrovsk. The city of Nikolaievsk on the Amur becomes an aviation centre from which lines go to Saghalien, Kamchatka and the Arctic Ocean.

In Central Asia the following new lines are to open: Tashkent—Alma Ata, connecting Central Asia with the capital of Kazakstan, and avoiding a rail journey of more than two days, Tashkent—Osh, Tashkent—Chardjui.

## A VERY SPECIAL ISSUE.

The Paris Aero Show will open on Nov. 28. Here in England we have had no show this year, nor shall we have one next year. Consequently our gallant Allies of the French Aircraft Industry will get a great free advertisement all over the World out of the reports of their show in all the aeronautical publications of the World. And, except for those few brave British firms which are going to the expense of showing at the Grand Palais, the British Aircraft Industry will not share in that free advertisement.

To counteract this state of affairs, and to give British aeroplanes, motors, material, parts and accessories, even a greater advertisement than our rivals will get from the Paris Show, The Aeroplane will publish on Nov. 22 a Special British Aircraft Issue, which will be in effect a Show Report of British aeroplanes and their components, as they would be if we had a show of our own. This issue will be confined entirely to British products.

Every firm concerned with the British Aircraft Industry has been asked to co-operate in making this issue an outstanding success. And every maker of British aeroplanes and engines whose products are being regularly manufactured has supported it handsomely, with only one or two minor exceptions, because of special circumstances.

Readers will find much interest in seeing the extent to which the auxiliary and ancillary trades, which have for the past few years been doing steadily increasing business through supplying material and parts to our aeroplane manufacturers, support the efforts of their best customers to make a first-class display on behalf of the British Aircraft Industry in other countries and in the Overseas Dominions against our foreign trade rivals.

The British Aircraft Industry is about the most wide-awake of British industries, its exports are increasing at a far greater rate than are those of any other trades, our aeroplanes and engines are admitted to be the best in the World, and the prospects for next year are very bright in spite of the much-advertised trade depression. Consequently this Special British Aircraft Industry Issue comes at the right moment to increase the psychological momentum in our favour.

It will be in the hands of all the Army, Navy, Air Service and Civil Aviation authorities (who are the people who ultimately influence the buying) of all nations, either before they go to the Paris Show or before they see the reports of the Paris Show (in the further countries, from which they cannot visit Paris). For their benefit all the reading matter will be printed in parallel columns of English and French,—for all the aeronautical people of all nations read one or other of those languages. And thus it will have a properly World-wide effect.

As this Special Issue is intended for World-wide circulation, and is outside the usual weekly issues of The Aeroplane, those regular readers of this paper who are not regular subscribers and want to make sure of getting copies are strongly advised to order them at once. The number printed will be large, but it cannot be unlimited, and those who do not order now will certainly not be able to get copies.

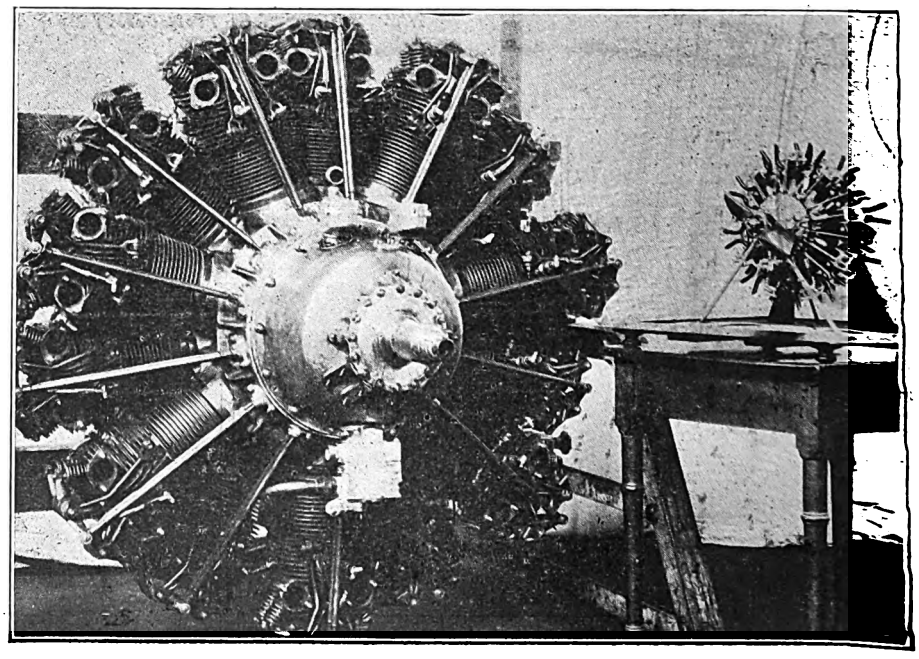
The price will be one shilling per copy. And, considering that the issue will contain illustrations and descriptions of the aeroplanes, engines and accessories which each firm in the Aircraft Industry regards as its best products, the publication will be very well worth having.

**THE SMALLEST WORKING AERO ENGINE IN THE WORLD.—The winner of the Championship Cup at the Small Power Engineering and Scientific Exhibition, was designed and built in his spare time by Mr. Gerald Smith of Armstrong Siddeley Motors Ltd.**

**This model 18-cylinder engine has over 3,000 parts. It took Mr. Smith six years to make on a 4 in. Drummond treadle lathe. Every part was made by the owner, who also made the patterns and castings.**

**The engine develops 15 h.p. and weighs 30 lbs. Each cylinder has four overhead valves and dual ignition. The valve-rockers are operated through push-rods, tappets and a cam-drum driven by an epicyclic gear. There is dry-sump lubrication, and a mixing fan incorporated in the induction system, and dual carburettors are fitted. The two-throw crank-shaft runs on ball-bearings.**

**The engine is valued at £2,000. It is seen in the photograph alongside an Armstrong Siddeley Jaguar in the show-rooms of Armstrong Siddeley Motors Ltd., in Bond Street.**



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# THE INQUIRY INTO THE LOSS OF THE R.101.

The Inquiry into the loss of the R.101 opened at the Institution of Civil Engineers on Oct. 28.

The Inquiry is being held by Sir John Simon, assisted by Lieut.-Col. J. T. C. Moore-Brabazon and Professor C. E. Inglis as assessors.

The Crown is represented by the Attorney-General (Sir William Jowitt), the Solicitor-General (Sir R. Stafford Cripps), and Mr. Wilfred Lewis. Mr. P. L. Teed is watching the proceedings on behalf of the widow of Flt. Lt. Irwin.

Before the proceedings began the Court stood in silence as an expression of its sense of the tragedy and in sympathy with the relatives of the dead.

Sir John Simon read the terms of reference and asked anyone who believed that he had any information to communicate with the Court.

The Attorney-General outlined the development of airship design from its earliest days and described the Government programmes of recent years. Replying to questions by Sir John Simon he said that theoretically the engines of R.101 should work out at about 5 lbs. per horse-power, in fact they worked out at 8 lbs. The voyage had been marked out in zones with a meteorological station in each zone and the meteorologist on board would be in touch with these stations.

The Attorney-General then gave details of the trial flights the airship had made and said that it had an airworthiness certificate for long-distance flights. He then described the construction of that part of the airship which contained the hydrogen. He added that research tests were being made on various parts of the airship taken from the wreck.

The Attorney-General next dealt with reports of previous flights made by the airship and referred to one in which mention was made of chafing of the gas-bags and subsequent loss of hydrogen. Dealing with the reconstruction of the airship he said that she had not come up to expectations with regard to lift and a middle section had been put in. This had not involved cutting into a solid member but merely unscrewing longitudinal pieces.

Sir John Simon said that instead of the trials recommended after the insertion of the new bay, only one trial of 16 hours had been made on Oct. 1 and 2.

The Attorney-General said that the Secretary of State for Air (Lord Thomson) had been most anxious to start the flight to India as early as possible. In a letter to Sir John Higgins (Air Member for Supply and Research, on the Air Council) Lord Thomson had said that so long as the R.101 was ready to go to India in the last week in September this further delay in getting her altered might pass. He must insist on the programme for the Indian flight being adhered to. Replying to Sir John Simon, the Attorney-General said that there was no written report of that trial.

The alterations to the airship had not only been the insertion of a central bay but had also been alterations to the engines which had included different arrangements for reversing. The Attorney-General asked for further search to be made for the missing documents concerning this trial flight. The time of the trial flight had been cut down from 24 hours to 16 hours by Wing Commander Colmore.

Regarding Professor Bairstow's report on the conditions of loading with the new bay, the Attorney-General said that there seemed to have been a lack of liaison between the designers and Professor Bairstow.

Dealing with the last voyage of the airship the Attorney-General said that one of the survivors had stated before he died that he was sent forward to release one of the ballast tanks. There was no water-ballast forward that could be released without going to it. On the other hand there was a message from the airship when crossing the Channel in the rain that they were refilling some of their water tanks. There was no evidence of any oil having been discharged with the exception of a small patch at Pois which might have come from the engine.

Squadron Leader Booth, replying to a question, said that emergency oil had been discharged from the airship on the Thursday before the R.A.F. Display. It had been released amidships to lighten her generally.

There was nothing in the weather charts on the morning of the flight to suggest any change in the plans for the start. The airship had experienced a steadily increasing wind and at the time of the crash the surface wind at Beauvais was about 30 miles an hour. Flying between 1,000 and 2,000 the R.101 had experienced higher velocities than this, but probably not more than 55 m.p.h.

Sir John Simon described the action of an altimeter and explained that accurate height could not be registered unless one was aware of barometric changes on the ground. The Attorney-General said that Dr. Simpson's report stated that the altimeter was reading correctly at the time of the accident so that if the navigators had neglected all considerations of change of pressure there would have been no error in determining their height. The maximum error which could have been made placed the ship 168 feet below her actual height.

The airship had sent out a message at midnight stating that the wind was 35 m.p.h., the altimeter height 1,500 ft. and the air temperature 51 degrees, with intermittent rain and clouds. They knew the ground temperature at Abbeville and from that they were able to work out approximately what height the vessel must have been to have found a temperature of 51 degrees. Taking the normal variation it would be 1,600 ft. according to Dr. Simpson's report. It could not have been less than 1,000 ft.

The question of rain was important because wetting the envelope added to the total weight and might also affect the engines.

From first to last there was never any message in the nature of an S.O.S. Sir John Simon then read the messages aloud to the Court. (They have already been published.)

The Attorney-General continued that the time of the crash was about nine minutes past two. A statement had been made by S. Church, a rigger, who had died in hospital. The statement was:—

> I would consider the flight rather bumpy, but not exceptionally so. The second watch had just come on and I was walking back when the ship took up a steep diving attitude, and at this moment I received an order to release an emergency forward water ballast of half a ton, but before I could get to it the crash came.

Important statements had been made by Disley, the electrician, who had said that while going over the Channel and dropping calcium flares Lt.-Commander Atherstone had told the flight coxswain not to allow the ship to go below 1,000 ft. and had himself pulled the ship up to that height. Disley also said that he was conscious of the ship dipping and being corrected. At that moment he was told that they were down and as he was trying to get up the ship went into a steep dive which threw him onto his bed. He heard the engine telegraph bell ring before the crash.

A report of a preliminary investigation by a committee under Air Ministry instructions stated that four wrist watches had been found, all of which had stopped at 02.09 hours.

It also stated that the drums on which the elevator cables were wound were practically to the limit of "full up elevator."

The summarised conclusions were that no part of the main structure of the airship broke in the air: impact with the ground occurred when the airship was inclined nose downwards at an angle between 15 and 25 degrees from the horizontal; that the elevator control-wheel was set for full-up elevator, while the rudder was practically straight at the time of the crash; a violent explosion occurred immediately or shortly after the ship crashed.

When the Inquiry was resumed on the third day the Attorney-General informed the Court that the report of the chief examiner who was in the R.101 during the trial flight had been found. Other reports of trial flights had also been found. Flight Lieutenant Irwin's report of the flight at the R.A.F. Display referred to very bumpy weather, and also said that the outer cover was flapping considerably more than on previous trials. He had also referred to numerous holes found in the gas-bags, but had added that the loss of gas would not account for the heaviness of the ship. He considered that the gas-valves might have been affected.

The Solicitor-General referred to a report concerning work which was being done on the airship, which included the fixing of bands to enable it to do a full-speed trial. For this purpose a car was fitted with a Condor engine and reversing gear to give the ship five ahead engines. When the full-speed trials were abandoned the fitting of reinforcing bands was stopped and a new cover was fitted.

The Attorney-General informed the Court that a sheet of the engine log of car unit No. 4 had been picked up fifteen metres to the east of the wreck. It showed the engine revolutions and cruising speed throughout the flight.

Professor Bairstow gave evidence about the system of construction of the R.100 and R.101. Replying to Sir John Simon, Professor Bairstow said that he had been to Beauvais to examine the wreckage and had found no indication that the structure had failed. On the Monday morning following the accident the control surfaces had been moved throughout their full range from the ground.

The Solicitor-General produced the spring on the starboard side to which the cable was attached and said that it had been found intact. The wire which passed through it was also intact.

Professor Bairstow then explained the operation of the automatic valves.

Professor Bairstow, continuing his evidence, described the tests made with models of the airship, and said that the results and observations of these tests were the foundation of the calculations he was checking. He agreed that the

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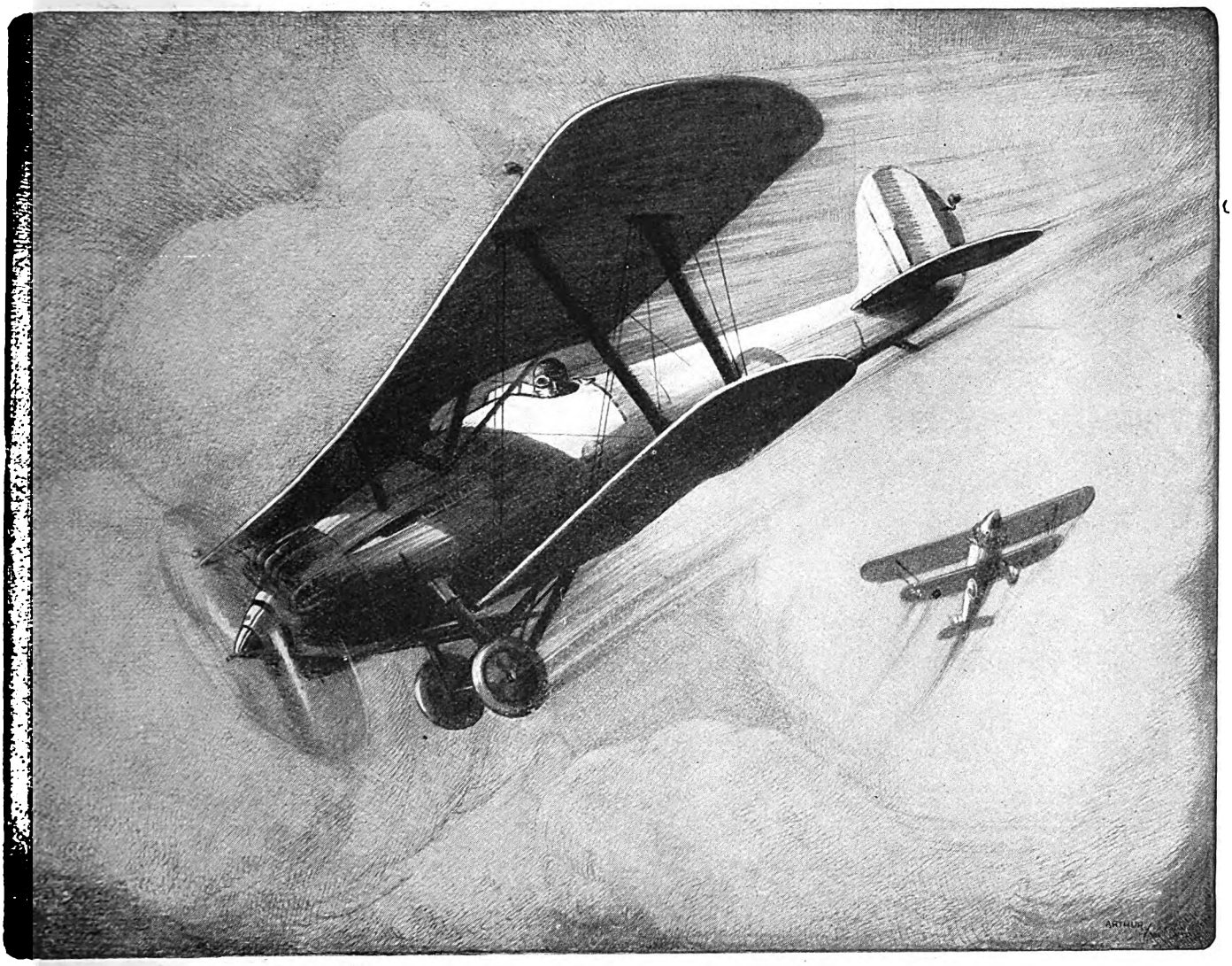

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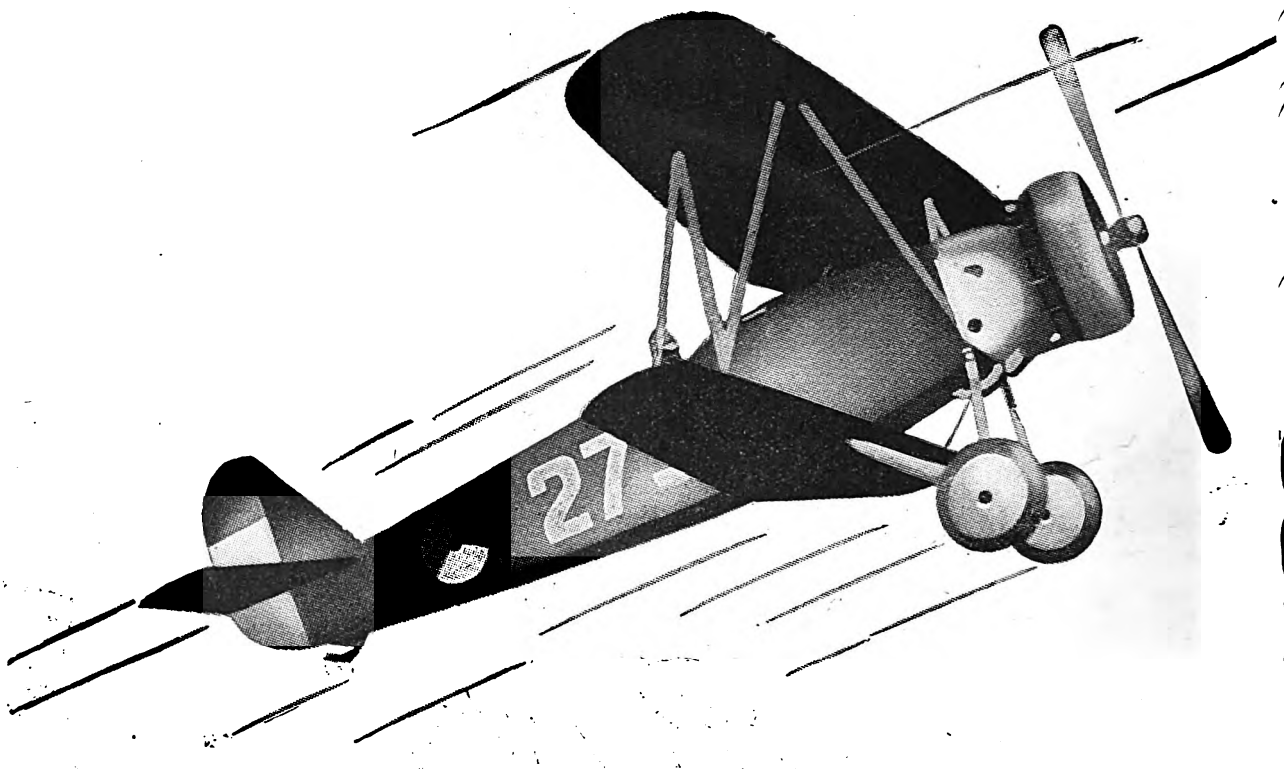


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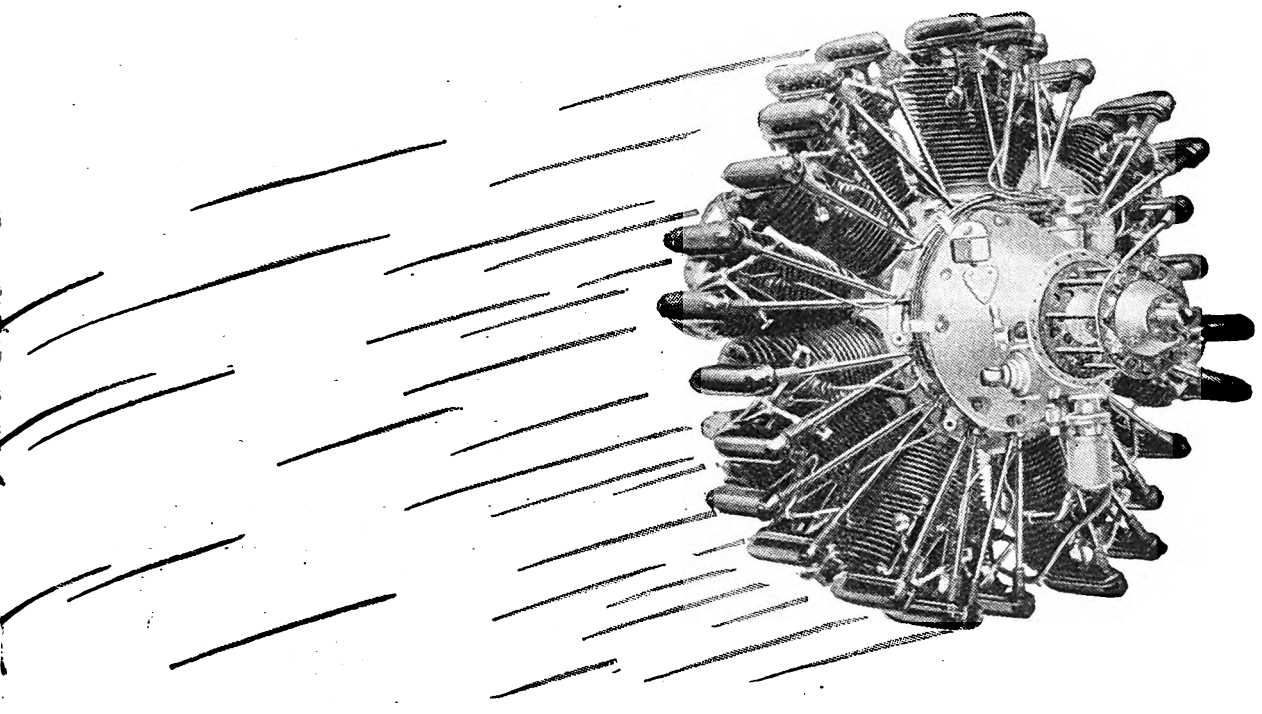

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experiments in the wind tunnel would not produce the same results whether the model represented a thing 724 ft. long or 777 ft. long.

Sir John Simon said that it had been pointed out to him that, considering its large dimensions, the R.101 had quite small fins—much smaller than the R.100—and the efficiency of the fins might vary with changes in the ship. He asked Professor Bairstow whether he considered that, for the purpose of obtaining certain calculations, experiments with a model in the wind tunnel would be a help, and Professor Bairstow agreed. Professor Bairstow explained that he had no responsibility for the engines, nor was the original design by which the balloons were anchored to the structure anything to do with him.

Sq. Ldr. Booth, the Commander of the R.100, described the duties of an airship crew and the general arrangement of watches, etc., on board.

Mr. A. J. Cook, one of the surviving engineers, said that he was in charge of the port midship engine-car from 8 to 11 p.m., when he was relieved by Mr. Blake. While he was on duty the engine was running normally. Lying in his bunk, between 11 and 2, he had noticed that two of the gasbags were surging about more than in other flights. He went down to the engine-car at about 2 o'clock and had a look round. About five minutes after he entered the car the ship took up a slight diving attitude. At it took up the diving attitude the engine telegraph rang for the engine speed to be reduced to slow. As he turned the lever to slow the ship took up a steep diving attitude. He looked round the engine car and then out of the window, and as he looked out of the window the ship struck the ground. He stopped his engine immediately, and a second crash came, followed by an explosion. The second striking and the explosion took place simultaneously. Cook then described how he escaped from the wreck, and in reply to a question by the Solicitor-General said that when they were flying over the Channel he noticed that he could distinctly see the waves of the sea, and that he had never noticed the wind so strong at any other time.

Mr. H. J. Leech, foreman engineer, said that there was nothing abnormal or difficult in the start of the airship from the mooring mast. After the start the ship was pitching and rolling more than usual. Sq. Ldr. Rope had noticed it, and was not worried about it. Over the Channel he thought the airship was roughly 700 or 800 ft. They had some trouble with the oil pressure in the aft engine, but it was put right. He was sitting in the smoking-room when the ship took a steep angle, he would say from 30 to 35 degrees. It continued this dive for about three-quarters of a minute, and then straightened out again. He had time to pick up the glasses and a siphon which had slid onto the floor and straighten the table before she dived again. Just before the second dive he heard the telegraphs go, and she struck about two seconds later. It was not a violent impact but more a crushing noise. Simultaneously with the impact the lights went out and within perhaps a second there was a flash of flame. There was no concussion. The smoking-room door swung open and he saw a white flame, not yellow like a hydrogen flame. There was thick, choking smoke in the room.

The witness explained that he escaped by tearing away one of the settees and crawling through the hole in the wall which this left. He was then in the hull, and made his way out through the cellon windows, which were blazing. Replying to the Solicitor-General, he said that he had noticed that the gas-bags 8a and 9 (referred to by Mr. Cook) were surging at the bottom on account of the wind getting through the ventilators. He had heard this while riding at the mast and afterwards.

Mr. A. Disley said that he was in charge of the electrical gear in the airship. He turned in at 9 o'clock and got up again at 9.45 because the lights "tripped" and threw the ship in darkness. After seeing to the lights he went to the control-room to speak to the wireless operator in the adjoining cabin.

While in the control room at about 10 o'clock Lt. Cmdr. Atherstone took over the elevator wheel from the coxswain and pulled the ship up from 900 to 1,000 ft., and handed back the wheel to the coxswain with the remark, "Don't let her go below a thousand."

Describing the disaster, Mr. Disley said that he woke from a doze as the ship was going into a dip. He was conscious that the ship straightened out at the bottom of the dip and seemed to climb. As she came to the top of the curve the chief coxswain came to the switchboard and said "We're down." The ship took a final dive, and he heard bells ringing. When the ship hit the ground the lights went out. There was an explosion, which came from forward of his own position. He heard several explosions. The telegraph bell rang after the coxswain had spoken to him.

Referring to the statement he had made in Beauvais Hospital, Mr. Disley explained that "tripping" the switches was done by pressing a button, with the object of stopping the making and circulating of electric current. There were no orders that this was to be done in the event of a crisis, but he knew from previous experience that in any aircraft smash there was always a chance of a fire. By tripping the field switch he would have broken one of the power circuits on the ship but not the other circuit. There was no master cut-out switch in the control car.

Mr. V. Savory, engineer in charge of the starboard midship car, said that everything was O.K. when he took over at 2 a.m. The engine was running at cruising speed. Just before the crash the ship gave a dip, not unusually severe. He then heard rumbling and crashing and things breaking. His engine was still running at cruising speed. He was not aware of any bell signal. The noise of the engine was too great for a bell to be heard in the car, there was an indicator on the dashboard to show them when it rang. He was looking at the dashboard at the time they hit the ground and received no signal whatever, nor did he hear any explosion. The only thing was a vivid flash, which scorched and blinded him. He got out by climbing over the girders. The sound he heard was more of a rumble than a bang. The only dive of which he was aware was the final one.

Mr. Albert Victor Bell, engineer, in charge of the aft car, said that he had had experience with airships since 1919. He had been on every flight of R.101 except the one on the day of the R.A.F. Display. He was in the aft car with Binks when the ship left Cardington on the flight to India. On leaving the mast there was some trouble with one of the starting engines forward but when they got away everything was normal. At about 8 o'clock (G.M.T.) the oil pressure dropped. The engine was shut down and the oil gauge changed but it was 11 o'clock before the engine was working again properly. After that the engine ran quite satisfactorily. The wind was rough but not unusually so.

Binks relieved him at 2.5 and he remained talking with him. The ship got an angle on, straightened out and went into another angle. He got a signal on the telegraph "Slow." He had just put the engine to slow when the ship hit the ground. He thought the first dive took from 25 to 30 seconds. Immediately they hit the ground there was an explosion. In a few seconds everything was surrounded by flames. Then the water tanks burst and the water came pouring over them. They picked their way out through the girders. Replying to Sir John Simon he said that he was sure that the engine did not gather speed in these two dives. He had no sensation of the ship striking the ground and then bounding up. He had made a statement in hospital that at the time he got clear of the ship the passenger accommodation was blazing but that the bow and the stern of the ship only showed patches of fire. The main blaze might have been over before he got out of the car. Referring to previous flights he said that dips had been experienced on the Thursday and Friday before the Display. It happened several times on the Friday. The trouble was always corrected by the elevator. None of these dives was so steep as those which occurred just before the accident.

Sir John Simon then read two extracts from the diary of Colonel Richmond, the designer of R.101:—

The first entry was: "June 27. The ship rode out a 12 hours' flight. During the rehearsals for the pageant, the ship had to be pulled rather suddenly out of a steep dive, and shortly afterwards one of the lifting bridles on the starboard side snapped. This was apparently due to the wear caused by its passing over the small pulleys in the chestnut fittings. It was noticeable that the ship, which was flying at comparatively low speed, had to be pitched up at the nose considerably and was rather unstable in pitch generally. A considerable amount of water ballast had to be dropped on landing."

The second entry was: "June 28. The ship flew for 12 hours, a temporary repair having been effected to the bridle. Again there were the same symptoms in flight. The ship satisfactorily carried out her part in the trials."

Mr. J. H. Binks, assistant engineer on the aft car, said that on the start of her flight to India the R.101 seemed to be inclined astern with her nose up in the air before she left the mooring tower. Three water-ballast tanks were released which he considered abnormal.

The Attorney-General then read out parts of a statement written by Mr. Binks after the accident. Regarding the last moments of the ship the statement read:—

Ship puts her nose down, responds to high engine speed, and quickly loses height. She quickly returns to a more even keel, but almost immediately gets into another dive. During this latter change the pointer on the telegraph goes to slow, which was immediately carried out. Just as the order was completed the ship crashed. The car did not strike the ground heavily, but bumped along causing the bottom to cave in.

Questioned about the dives Mr. Binks said that the first dive was much steeper than the second. He thought the angle would be 25 to 30 degrees, the second dive was only half that. The ship was hardly off an even keel before she crashed. Referring to previous flights he said that he remembered the airship making dives on June 27 and 28. They were not dives of the description experienced on the last flight and the ship did not travel far in them. It had however made dives as steep as the last one when approaching the mooring tower.

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At this stage a contour map was produced and examined by the Court. Sir John Simon explained that it was a large scale French map of the area round Beauvais with contours indicating the height of the ground at every five metres. The exact position of the airship after the crash was indicated on the map. Her nose and her tail were each of them resting on the 100 metre line. Between the nose and the tail there was a slight depression which went below the 95 metre line but not quite to the 90 metre line. The forepart of the airship would be resting in a wood and the other part was on some sort of track. The direction in which the wreck was heading was approximately 20 deg. west of south,—which was practically S.S.W. That heading was not the course which the airship was travelling.

Major Cooper (Air Ministry Inspector of Accidents) said that he went to the scene of the accident and took statements from some of the survivors. Rigger Church was a very sick man and it was difficult to get a coherent statement from him but he gave the evidence already reported.

Major Cooper, continuing his evidence, said that he had spoken to a number of people in France and was satisfied that no other witnesses could be procured. When he arrived he was told that pieces of a reefing girder had been picked up at a distance of 50 or 100 yards and had been laid alongside the wreck. Small fragments were also found in a wood to the north-east of the wreck. He and others had also come across a large number of small pieces in the wood showing evidence of burning. The wood was a quarter of a mile away from the disaster. He had also found a few small fragments further afield which seemed to have been blown there by the explosion. One small piece of metal which was found several kilometres from the wreck might have been picked up and dropped again by some souvenir hunter. He had no ground whatever for supposing that the airship broke to pieces in the air.

M. Jules Patronne, secretary of the Beauvais Police Station, whose evidence was given in French and interpreted, said that he was in bed when the noise of the airship's engines woke him. He got up and went to the market place and saw the airship passing east of Beauvais. He could see the outline of the ship and three green lights. It was flying horizontally and slightly into the wind. He saw it dip, come level, and dip again. On the second dive she disappeared from view. He heard no noise after the second dip and thought that the wind prevented the noise from coming to him. He saw flames and what seemed to be burning paper driven in the wind. The wind was violent, blowing in gusts, and the rain was heavy.

M. Henri Terminal, M. Lucien Lechat, M. Louis Petit, M. F. Radel, all gave similar evidence.

M. Alfred Rabouille said he was going to the wood to try to get some rabbits and was about 250 metres from the wood when he saw the airship coming from the direction of Allonne. It was not going steadily. He saw the lights go out. There was an explosion followed by two others and then a terrific glare. He only saw one dive. The airship was from 150 to 200 metres high. The airship did not bounce after it hit the ground and the flames seemed to start from the front. As the airship got near him it was very near the ground. It descended slowly at first and did not get back to a horizontal position before hitting the ground. It fell about 250 metres from him. It broke on touching the ground.

Mr. Lewis read the dispositions of a number of French witnesses all of whom described the glare and the sound of an explosion. Mr. Lewis informed the Court that every effort had been made to find any trace of oil ballast having been dropped but without result. Sir John Simon pointed out that if the airship dropped oil ballast while she was travelling at 50 knots the oil would travel forward before it fell. Possibly if oil were dropped at the last moment, in the result it would only serve to make part of the bonfire.

## THE PRIME MINISTER ON R.101.

The Prime Minister, in the Debate on the Address in the House of Commons on Oct. 28 said:—

The disaster which befell Airship R.101 on that Sunday morning stands alone in the records of such mishaps for the bitter fatefulness of that tragic drama. As not only the head of the Government, but the Leader of this House I take the opportunity of having placed upon our records our grief for the loss of the brave men of all ranks who met death together, and now so appropriately share a common grave.

Their leader was a devoted friend of mine. He was also a great Minister devoted to the service of this State and in many fields of action, the inspiring head of a department of gallant pioneers in whose ranks have been enlisted some of the finest and most single-minded and promising of the youth of this country—the Air Force. They have all gone, but in the music to which one moved on that day of funeral, the prayers of uncontrollable grief were broken by the twittering notes of sustaining faith and hope, and those twittering notes now must become the predominant music to which we move in the future on the paths which they have followed. I know that Lord Thomson, Sir Sefton Brancker and their comrades believed that they were pioneers of conquest, and they have handed over a great trust to the nation to continue their work.

Our first duty has been to have a thorough and searching inquiry into the causes of the accident, to secure the judgment and the best thought on the fullest powers which can be set up. I think I can say, in the name of the whole House, that we have been fortunate both in the court and in the assessors, and we are under great obligations to them for having undertaken their task. It is not fitting that I should pass on without an expression of thanks and gratitude to France, and especially to M. Tardieu, as head of the nation, for the way he so feelingly associated himself personally with the State ceremonies attending the disaster, and the arrangements he caused to be made in the work of taking the bodies home with efficiency and reverence, and to the Mayor of Beauvais and all the kindly people whom he represents for what they did with so much human consideration and thoughtfulness, with so much tender care and feeling, to respect the dead and nurse the living. France has once again touched the hearts of our people.

## AWARDS FOR GALLANTRY.

His Majesty the King has been pleased to award the Albert Medal to Mr. Henry James Leech, A.F.M., foreman engineer, in recognition of his gallantry when the Airship R.101 was wrecked. [After escaping he returned to the burning wreck and did his best to rescue others.—ED.]

His Majesty has also approved the award of the Medal of the Civil Division of the Order of the British Empire for Meritorious Service to Mr. Arthur Disley, wireless operator of the Airship. [In spite of his injuries he went to the telephone at Beauvais and communicated with the Air Ministry.—ED.]

## THE CARDINGTON AIRSHIP WORKS.

In the House of Commons on Oct. 30, in reply to a question by Mr. Malone, the Under Secretary of State for Air said that the loss of the Airship R.101 had made it necessary to issue notices of discharge to 139 men and 94 women employed at the Royal Airship Works, Cardington: also arrangements had been made to transfer another seven employees to other stations. The employees concerned had been insured against unemployment and, on discharge, would receive such benefit as they might be entitled to under the Unemployment Insurance Act. [Which is a polite and politic way of saying that they can now go "On the Dole" along with the Can't Works and Won't Works,—pleasing position for people who have given many of the best years of their lives in Government employ. Many of them will doubtless be converted to Socialism, when they compare their lot with that of fellow-workers who are employed by mere human capitalists, who, when one branch of their trade is slack concentrate their capital and labour on some fresh activity.—C. G. G.]

## THE DEPENDANTS OF THE CREW OF THE R.101.

In the House of Commons on Oct. 30, in reply to a question by Mr. Malone, the Under Secretary of State for Air said that the grant of pensions or gratuities to the dependants of those who lost their lives in the R.101 was governed by King's Regulations and Air Council Instructions in the case of Air Force personnel and by the Treasury Warrant of Jan. 17, 1919 and the Home Secretary's Aircraft Order of Sept. 19, 1924 in other cases. The nature and amount of these awards varied according to circumstances, but in every case the widow would be entitled to a pension during widowhood and in most cases the children would also be entitled to pensions. These children's pensions would be payable in some cases to the age of 21, in others to the age of 18 and in others to the age of 16. The House could rest assured that the matter had received the most sympathetic consideration, and that the regulations would not be interpreted in any narrow or grudging spirit.

## A BRANCKER STORY.

One of the best stories of the late Air Vice-Marshal Sir Sefton Brancker came out by accident while some flying people were talking about him the other day.

One of them had on a certain occasion wanted to fly to or through or across Turkey, and the Turkish representatives here had been, according to Oriental custom, raising various and sundry objections and obstructions. Therefore the air tourist went down to see Sir Sefton at Gwydyr House, relying on the D.C.A.'s curious ability in cutting through regulations.

He stated his case, Sir Sefton pressed a bell for his typist, and began a letter, "Dear Kemal."—After which he proceeded to say that Mr. So-and-So particularly wanted to fly to, through or over Turkey and that the Turkish officials here were being officious and sticky, and would he, Kemal, see that they stopped it.

The man who could calmly sit down and write to the President of the Turkish Republic, the Ghazi Mustapha Kemal Pasha, as "Dear Kemal," was capable of anything. And, of course, being Brancker, permission to go wherever he jolly well pleased in Turkey arrived for the tourist by cable a few days later.

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## AN AIR MAIL ACCIDENT.

On Thursday, Oct. 30, a Handley Page W. 8 (two Rolls-Royce F XIIA engines) belonging to Imperial Airways Ltd., and called the *City of Washington* crashed near Neufchatel about 10 miles south of Boulogne. The pilot and one passenger were seriously injured, another passenger died on Nov. 2, and the mechanic and two passengers were killed on the spot

The pilot Mr. J. J. Flynn has been a reserve pilot for Imperial Airways, Ltd., for about ten months. At 10.45 hours on Oct. 30 he set off from Le Bourget with a twin-engined Handley Page to bring the Indian mails to Croydon, after the regular morning Argosy had left. Visibility was poor and the Argosy itself was held up by fog. Reports state that the passengers in the mail machine were warned that the journey would be attended with risk and was not a regular passenger run.

Soon after noon the Handley Page was seen flying very low through the fog near Neufchatel but none of the neighbouring people heard or saw anything more of the machine until 14.00 hours. At that time two French workmen came across one of the passengers, Mr. Tompkins, crawling along looking for help. He indicated to them that the wreck had happened a mile away on the plateau of La Chapelle two hours before.

Reports vary concerning the exact cause. Engine failure has been mentioned, but denials have been issued, and the general idea is that bad weather alone was responsible. In any event the machine hit the ground in something like flying position and destroyed the undercarriage, after which it skidded along and broke up.

Mr. Flynn had both legs broken and one of them had to be amputated above the knee. He also suffered head injuries. The three killed were James Street, secretary of the G. W. Carnrick Company, an American firm; Mr. A. C. James, an employee of Imperial Airways in Cairo returning home on leave and Mr. F. H. Mason, the mechanic.

The other passengers both belonged to the firm of A. V. Roe and Co. Ltd. Manchester. Mr. F. B. Tompkins is a well-known pilot and flew an Avian monoplane in the King's Cup Race this year. In spite of badly crushed legs he crawled nearly a mile and brought help to his companions. The first report—that one of his legs had to be amputated—was fortunately unfounded.

Mr. Harry Bolsover, of Stretford, Manchester, was more seriously injured and died on Nov. 2 from acute meningitis caused by severe head injuries. He was chief inspector for A. V. Roe and Co., Ltd., and had been with the firm for 15 years. He was returning with Mr. Tompkins from Egypt where they had been to overhaul and test an Avro V which had been chartered by Imperial Airways Ltd.

The Handley Page, which was entirely wrecked, was a rebuilt machine which had been flown in service some seven years and had been passed as airworthy. It was originally a three-engined machine, known as the Hampstead, and had a Rolls-Royce Eagle in the nose and a Siddeley Puma on each wing. As such it was not a success, and the present writer, who flew in it once as a passenger, regards it as the least pleasing aeroplane in which he has ever flown. Recently it has been transformed into a two-engined machine and fitted with two Rolls-Royce F XIs, with the idea, apparently, of using it as a flying test-bed to try out these engines on transport work. With them it was faster than most big aeroplanes, and pilots seemed to like it.

The announcement by the Chairman of Imperial Airways Ltd. that two-engined machines were not to be used on the cross-Channel passenger service did not affect this machine. It was used for goods and mails. The passengers who were on board may be regarded as "privilege" passengers, in that, except Mr. Street, they were all directly or indirectly in the employ of Imperial Airways Ltd.

## THE MEOPHAM ACCIDENT.

The following interim Report of the Accident to the Junkers G-AAZK, at Meopham, Kent, on July 21, has been issued by the Investigation Sub-Committee:—

1. The inquiry was referred to the Aeronautical Research Committee on the 25th August and the Sub-Committee for Accident Investigations began work on the 3rd September. The first three meetings were held on consecutive days and others since at such intervals that the progress with experiments, investigations, and calculations has been continuous.

2. The aeroplane flying from Berck to Croydon crashed at Meopham, Kent, at about 14.35 hours on July 21st, 1930 (there was a strong westerly wind, gusty with storms of rain). In the neighbourhood of Priestwood it had been seen to fly into a cloud and very shortly thereafter the personnel, pieces of tail-plane, a wing, the engine, the fuselage and various items fell from the cloud and were distributed along a belt one and a half miles' long (east to west).

3. In general the procedure of the Sub-Committee is directed to the discovery of the technical causes of accidents with a view to their prevention in the future and for the above purpose in the present instance it became necessary to examine all the details of the accident. Among such are the position on the ground of each fallen object, and the probable path of its falling, having regard to the wind prevailing at the time, the nature of the fractures, the strength and condition of each element of the structure of the machine, the load each member was intended to bear and the maximum load which may have come on it during the accident, with much other relevant matter.

4. The procedure of the Sub-Committee is similar to that which has been successfully followed in many investigations of a like nature. The evidence considered relates to the reports of eye-witnesses, to distribution of the parts, to meteorological conditions, and to the histories of the pilots. On this evidence theories are advanced as to the probable first cause of the accident. The more plausible theories are subjected to criticism and tested where necessary, both by detail calculations and by experiments which may be lengthy.

5. It frequently happens in an investigation of this kind that some one specific cause, such as defect in material or an abnormal meteorological condition, is so clearly sufficient to account for the accident that it becomes unnecessary to investigate fully alternative explanations. In such circumstances the inquiry can be brought to an early conclusion. In the Meopham accident no such obvious cause has come to light and the inquiry has perforce to proceed by the exclusion one by one of all reasonably possible causes. Only when this has been done is it proper to attribute the accident to some cause, which cannot from its nature be indicated by direct evidence, such as unforeseen meteorological conditions, or the manœuvres made by the pilot, or etc. Such a process, if carried out thoroughly, is essentially lengthy.

6. For the Meopham accident the available data have been collected and examined, and details as to the breakage of the structure are clear. The Sub-Committee are now in a position to state that careful examination of all main fractures has revealed no defect in structure or assembly. Further, there are no signs of faulty or inferior material in the fractures. The Sub-Committee are therefore looking for other possibilities.

7. As an example of the type of investigation still in progress the Sub-Committee have to determine whether flutter can have been the cause of the accident. The experience of the Sub-Committee in the past shows that breakages in the air arise from time to time from flutter of the tail or of the wing of the machine. No evidence has been brought to the Sub-Committee of flutter of existing Junkers aircraft of the F.13 type, of which there are a large number in use; nevertheless, the possibility of flutter among other causes cannot be dismissed until the conclusion of experiments now in hand.

8. The Sub-Committee are aware that a definite conclusion as to the cause of the accident should be made available at the earliest possible date, but they think it undesirable to express an opinion, which must be provisional.

9. They desire to recognise the willing help they are receiving from the Junkers Company, from the Deutsche Versuchsanstalt fur Luftfahrt and from the Staffs of the Royal Aircraft Establishment and at the National Physical Laboratory. They are also particularly indebted to Major J. P. C. Cooper, the Inspector of Accidents, for his detailed and accurate reports.

(Signed) MERVYN O'GORMAN, Chairman,
Accidents Investigation Sub-Committee.

## A FATAL ACCIDENT.

On Saturday, Nov. 1, early in the morning, Mr. Douglas Henry Corsellis took off alone in his privately-owned Moth from Stag Lane during a thick fog. Some moments later he crashed and was killed, apparently after realising that conditions were too bad and trying to get back into the aerodrome. The wreckage was destroyed by fire.

Mr. Corsellis was a barrister of New Court Temple, E.C., a member of the Inner and Middle Temples, and was called to the bar in 1922. He was 33 years of age and leaves a widow and three children. He was in the habit of flying to his country house near Nayland, Suffolk, at week-ends, and that was his intention on the day he met his death.

## A JOHNSTON MEMORIAL.

Among those who died in the R.101 none is more worthy of a memorial than Squadron Leader E. L. Johnston, O.B.E., A.F.C. He may rightly be called the father of British air navigation. He was one of the founders of the Guild of Air Pilots and Air Navigators of Great Britain and he did more than anybody else to get together the body of men who founded the Guild.

Having got them together, he set them in the right way of forming a Guild which would put air navigation in the position which it ought to occupy. We may safely say that the present standard of air navigation in this country, which is higher than it is in any other country in the World, was due to him. And he himself persevered with the teaching of every class since the second-class navigator's licence became a requirement for our commercial pilots. Air navigation is officially considered to be as important as flying training—which incidentally is subsidised by the Air Ministry—and the more is therefore due to the memory of the man who has done so much for the science.

Very rightly, therefore, a sum of money is being collected with the idea of buying a silver trophy which will be presented annually by some competent organisation for the best feat of civil air navigation during the preceding twelve months. This is precisely the kind of memorial which our friend Johnston would most desire.

Probably those who actually learned their navigation from him have already subscribed to the Fund, but there must be many others who realise his worth and would wish to subscribe. Will they please, therefore, send their subscriptions to Captain A. G. Lamplugh, Lloyd's Building, 3-4, Lime Street, London, E.C.3, and cross their cheques "Johnston Memorial Fund."

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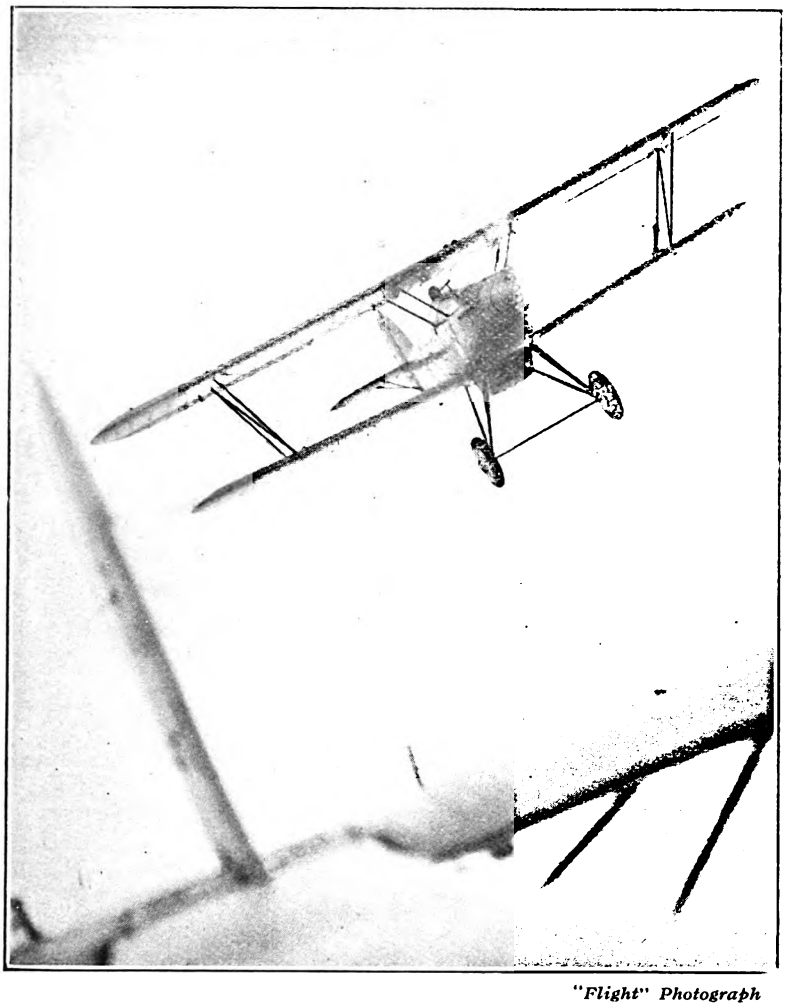

*"Flight" Photograph*

The Hawker "FURY" Interceptor Fighter with Rolls-Royce "F" Engine has been selected for R.A.F. equipment after extensive competitive trials. This action, following the standardization of the Hawker "Hart"—also with "F" Engine—is a striking tribute to the all-round superiority of Hawker productions.

"The introduction of the 'Fury' and 'Hart' as the leading R.A.F. aircraft will place the British Service in advance of all others."

—*Morning Post*, October 17th.

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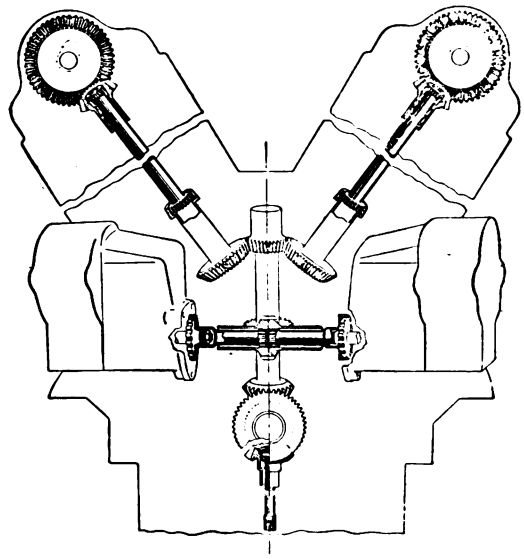

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The Rolls-Royce design of free coupling shafts, splined at both ends, while eliminating any possibility of strain due to slight errors in alignment, also provides a ready means of obtaining a fine adjustment when timing magnetos or camshafts.

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, October 28.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Flg. Off. E. D. Mills, R.A.F.O., is granted a S.S. Comn. as a Plt. Off. (Oct. 20). The following Plt. Offs. are promoted to the rank of Flg. Off.:—R. C. A. Brooke-Beer (Aug. 22); G. J. Pawson (Sept. 15); G. F. Alexander (Oct. 2); R. Ellison (Oct. 13).

Flg. Off. R. R. Bennett takes rank and precedence as if his appointment as Flg. Off. bore date Dec. 28, 1928, immediately following Flg. Off. L. S. Tindall on the gradation list. Reduction takes effect from Oct. 6.

Flt. Lt. A. J. E. Broomfield, D.F.C., is placed on the retired list at his own request (Oct. 29); Flg. Off. H. C. Johnson is transferred to the Reserve, Class C. (Oct. 17); Lt. C. W. Phillips, R.N., Flg. Off., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Oct. 7); Flg. Off. J. C. Allan resigns his S.S. Comn. (Oct. 29); the S.S. Comn. of Plt. Off. on probation P. W. E. Ryland is terminated on cessation of duty (Oct. 14).

MEDICAL BRANCH.—Flg. Off. P. J. McNally, M.B., B.Ch., is granted a perm. comn. in this rank (Oct. 29).

DENTAL BRANCH.—S. C. Allen, L.D.S., is granted a non-perm. Comn. as a Flg. Off. with effect from and with seniority of Oct. 13.

LEGAL BRANCH.—Sq. Ldr. D. L. Ingpen is promoted to the rank of Wing Cdr. (Aug. 11); Flt. Lt. (acting Sq. Ldr.) G. S. Marshall, O.B.E., is promoted to the rank of Sq. Ldr. (Aug. 11).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—C. Watson is granted a comn. in Class A.A. (ii) as a Plt. Off. on probation (Oct. 15). The following Officers are re-employed with the Regular Air Force for a further year (Oct. 24):—Flt. Lt. F. Thomasson, D.F.C., M.M., Flg. Off. L. A. Parker. The following Flg. Off. on probation is confirmed in rank:—J. W. Rayner (Sept. 13).

The following Flt. Lts. are transferred from Class A to Class C:—E. R. Maddox, M.C. (Mar. 24); G. Rose (Oct. 26).

Flg. Off. H. E. F. Saunders relinquishes his comn. on completion of service and is permitted to retain his rank (Sept. 12); Flt. Lt. W. E. C. B. C. Forsyth relinquishes his comn. on completion of service (Oct. 23); Flg. Off. E. D. Mills relinquishes his comn. on appointment to a S.S. Comn. in the R.A.F. (Oct. 20); the comn. of Plt. Off. on probation A. J. Hewetson is terminated on cessation of duty (Sept. 28).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—Plt. Off. H. O. Young relinquishes his comn. on account of ill-health (Oct. 29).

## The Higher Command.

The Air Ministry announces the following appointment:—Air Commodore Reginald Percy Mills, C.B., M.C., A.F.C., now Chief Staff Officer, Headquarters, Royal Air Force, India, to be Air Officer Commanding, Royal Air Force, Halton, and Commandant, of No. 1 School of Technical Training (Apprentices), in August, 1931, vice Air Commodore Ian Malcolm Bonham-Carter, C.B., O.B.E., on the latter completing his period of appointment.

## Appointments.

*Week ending November 4.*

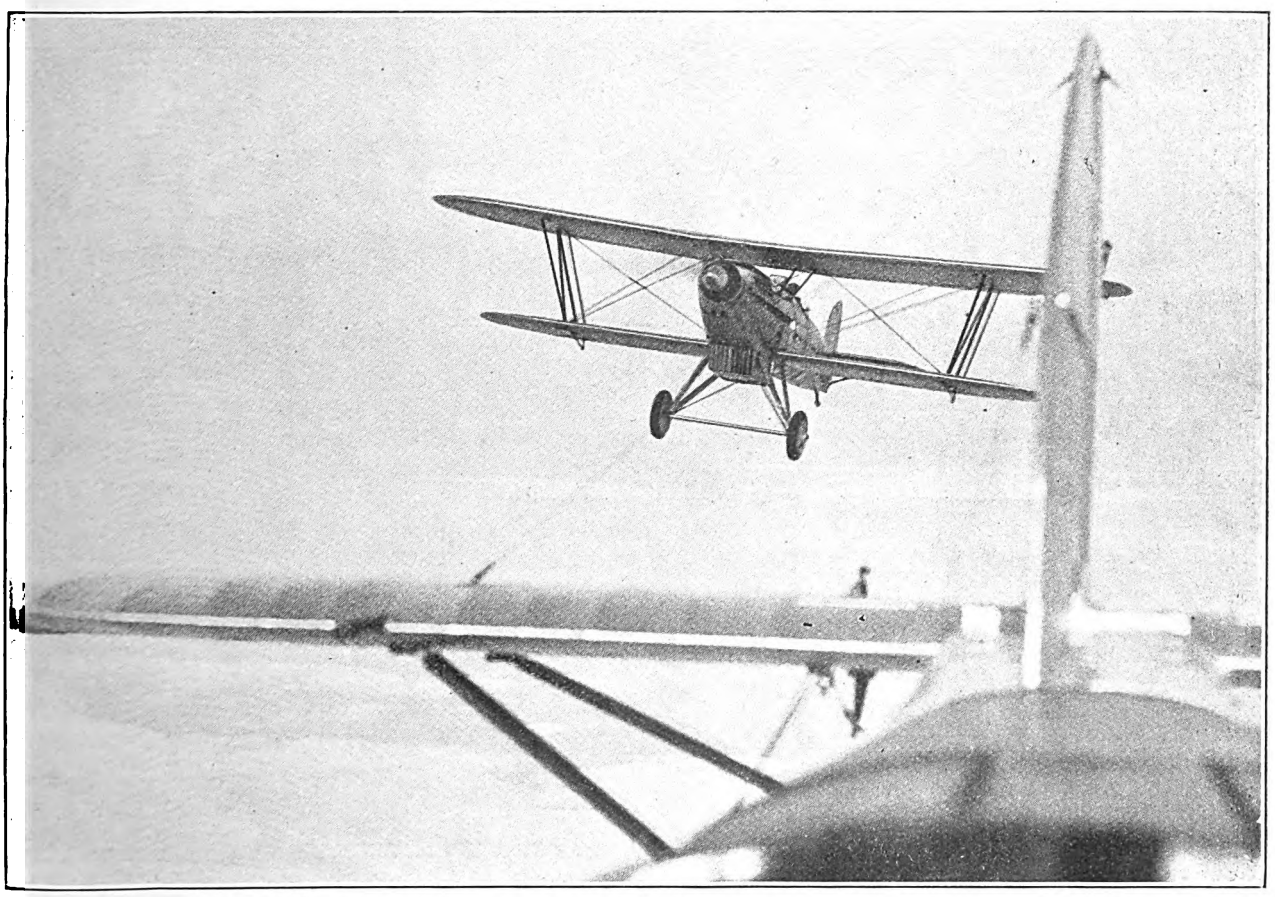
GENERAL DUTIES BRANCH.—Wing Commander J. K. Wells, A.F.C., to Special Duty List, on appointment as R.A.F. Representative, Ordnance Committee, Woolwich, 27/10.

Squadron Leader A. T. Williams, to H.Q., A.D.G.B., Uxbridge, 27/10.

Flight Lieutenants S. H. Ware, to No. 24 Sqdn., Northolt, 3/11. H. J. Adkins, to E. and W. School, Cranwell, 22/10. W. L. Payne, to No. 503 Sqdn., Lincoln, 31/10. G. Combe, to H.Q., Wessex Bombing Area, Andover, 20/10. G. M. F. O'Brien, D.S.C., to No. 504 Sqdn., Nottingham, 27/10. C. W. Busk, M.C., A.F.C., to A. and G. School, Eastchurch, 30/10. W. E. G. Mann, D.F.C., to H.Q., Wessex Bombing Area, Andover, 1/11. L. E. M. Gillman, to H.Q., 'Iraq Command, Hinaidi, 29/9. W. J. Richards, to No. 4 Sqdn., S. Farnborough, 9/10. H. H. Brookes, to No. 84 Sqdn., Shaibah, 5/10. C. R. Strudwick, to Station H.Q., Upper Heyford, 22/10. A. E. Beilby, to Station H.Q., Donibristle, 14/10. G. V. T. Thomson, to R.A.F. Training Base, Leuchars, 14/10. H. E. Walker, M.C., D.F.C., to No. 45 Sqdn., Helwan, 6/10. R. M. Foster, D.F.C., to No. 70 Sqdn., Hinaidi, 18/10.

Flying Officers P. Coyle, to Home Aircraft Depot, Henlow, 17/10. R. F. Part, to No. 60 Sqdn., Kohat, 7/10. J. R. Mathews, to Aircraft Park, Lahore, 1/10. M. M. Restell-Little, to R.A.F. Depot, Uxbridge, 12/10. D. Dickson, to No. 9 Sqdn., Manston, 25/10. W. D. J. Michie, to No. 14 Sqdn., Palestine, 13/10.

Pilot Officers A. C. Richardson, to Aircraft Depot, Karachi, 17/9. J. A. Nicholson, to No. 11 Sqdn., Risalpur, 17/9. T. King, to R.A.F. Depot, Uxbridge, 20/10. P. J. W. Hawkins, to No. 3 F.T.S., Grantham, 27/10. E. D. Mills, to No. 2 Sqdn., Manston, 20/10. D. E. Milson, to No. 29 Sqdn., North Weald, 21/10. The undermentioned are all posted to No. 3 F.T.S., Grantham, with effect from 25/10:—A. A. Adams, D. J. Bateman, J. A. B. Begg, G. R. Canavan, A. L. Christian, W. I. Clarke, A. E. Clouston, J. A. Dobson, J. N. Dufort, J. A. C. Forbes, E. Foster, W. M. Hargreaves, R. H. Harris, W. H. Husbands, N. A. Ireland, L. S. Lamb, L. T. McGinn, J. J. Murphy, L. J. Neale,



**ON THE TAIL.—The Fairey Firefly (Rolls-Royce "F" engine) as seen from the gunner's cockpit of a Fairey III.F.**—(*"Aeroplane" photograph.*)

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F. R. Newell, H. L. Pendal, R. A. Phillips, H. Pilling, R. C. J. Rice, D. G. Singleton, F. G. L. Smith, J. G. Younghusband.

MEDICAL BRANCH.—Flight Lieutenant C. P. O'Toole, to R.A.F. Depot, Uxbridge, 20/10.

STORES BRANCH.—Flight Lieutenant E. W. Lawrence, to No. 45 Sqdn., Helwan, 16/10.

Flying Officer W. T. Lewis, to Station H.Q., Hendon, 23/10.

DENTAL BRANCH.—Flying Officer C. M. Leckie, to R.A.F. Training Base, Leuchars, 18/10.

### A Fatal Accident.

The Air Ministry regrets to announce that as the result of an accident at Cranwell, Lincolnshire, to an Atlas machine of the R.A.F. College, Cranwell, on Oct. 30, Flight Cadet Peter Berry, the pilot and sole occupant of the aircraft, was killed.

### A Service Flight from Delhi to Siam.

An official visit to Siam by air will be paid this week by Air Marshal Sir Geoffrey Salmond, K.C.B., K.C.M.G., D.S.O., Air Officer Commanding, R.A.F., India. Sir Geoffrey Salmond will travel in a Westland Wapiti, piloted by Flt. Lt. W. F. Dickson, D.S.O., A.F.C., his Personal Assistant, and will be accompanied by Colonel J. F. Turner, D.S.O., R.E., Flt. Lt. D. F. Anderson, D.F.C., A.F.C., and Flt. Lt. F. J. Fressanges, who will fly in another Westland Wapiti and in a Handley Page Hinaidi.

The party propose to fly from New Delhi to Allahabad (350 miles) on the first day; to Calcutta (450 miles) on the second day; to Rangoon (750 miles) on the third day; to remain at Rangoon for one day and to fly to Bangkok (400 miles) on the fifth day. They will spend three days at Bangkok, where they will be the guests of the State. On arrival at Bangkok they will be received by the Siamese Air Force, and on the following day Sir Geoffrey Salmond will have an audience of the King.

On leaving Bangkok the party will fly to Alor Star, near Penang, and should arrive at Singapore on Nov. 12.

One of the objects of the journey is to report on the conditions of the land route to Singapore.

Sir Geoffrey Salmond hopes to be back in New Delhi on Nov. 20.

### Khartum to Gambia.

The Flight of No. 47 (B) Squadron, under Sq. Ldr. E. L. Howard-Williams, M.C., which has been flying from Khartum to West Africa, reached its destination, Bathurst, the capital of Gambia, on Nov. 3.

### Aden to Abyssinia.

Three Fairey III F (Lion engine) aeroplanes of No. 8 (Bomber) Squadron, R.A.F., under the command of Sq. Ldr. J. L. Vachell, M.C., flew from their base at Khormaksar, Aden to Addis Abbaba, Abyssinia on Oct. 28 to take part in the celebrations in connection with the coronation of the King of Abyssinia. The other two pilots were Flt. Lt. R. Y. Eccles and Flg. Off. A. L. Weait. The Flight landed on the racecourse at Addis Abbaba and was received by the British Minister, Sir Sidney Barton.

### H.M.S. Hermes.

H.M.S. *Hermes*, the smallest of the Navy's aircraft carriers, left Sheerness on Nov. 4 to return to duty in China. On her passage out, H.M.S. *Hermes* will spend six days at Malta and ten days at Singapore. She should reach Hong Kong on Jan. 5.

The Senior Air Force Officer in H.M.S. *Hermes* is Sq. Ldr. A. W. F. Glenny, M.C., D.F.C.

### The Disarmament Commission.

Group Captain J. T. Babington, D.S.O., R.A.F., Air Representative, League of Nations, and Squadron Leader L. G. S. Payne, M.C., A.F.C., R.A.F., are among those who will assist the Lord Cecil of Chelwood, the British Representative on the League Preparatory Commission for Disarmament at the last meeting before the World conference on disarmament at Geneva this week.

### Afridi versus Aeroplane.

An *Exchange Telegraph* message from Peshawar, dated Nov. 1, states—

A jirga was held yesterday by about 2,000 Afridis. Aeroplanes which watched it were fired upon.

An aeroplane crashed to-day between Peshawar and Risalpur. The occupants were unhurt.

Another message stated that the aeroplane was brought down by Afridi rifle fire.

### The R.A.F. War Memorial.

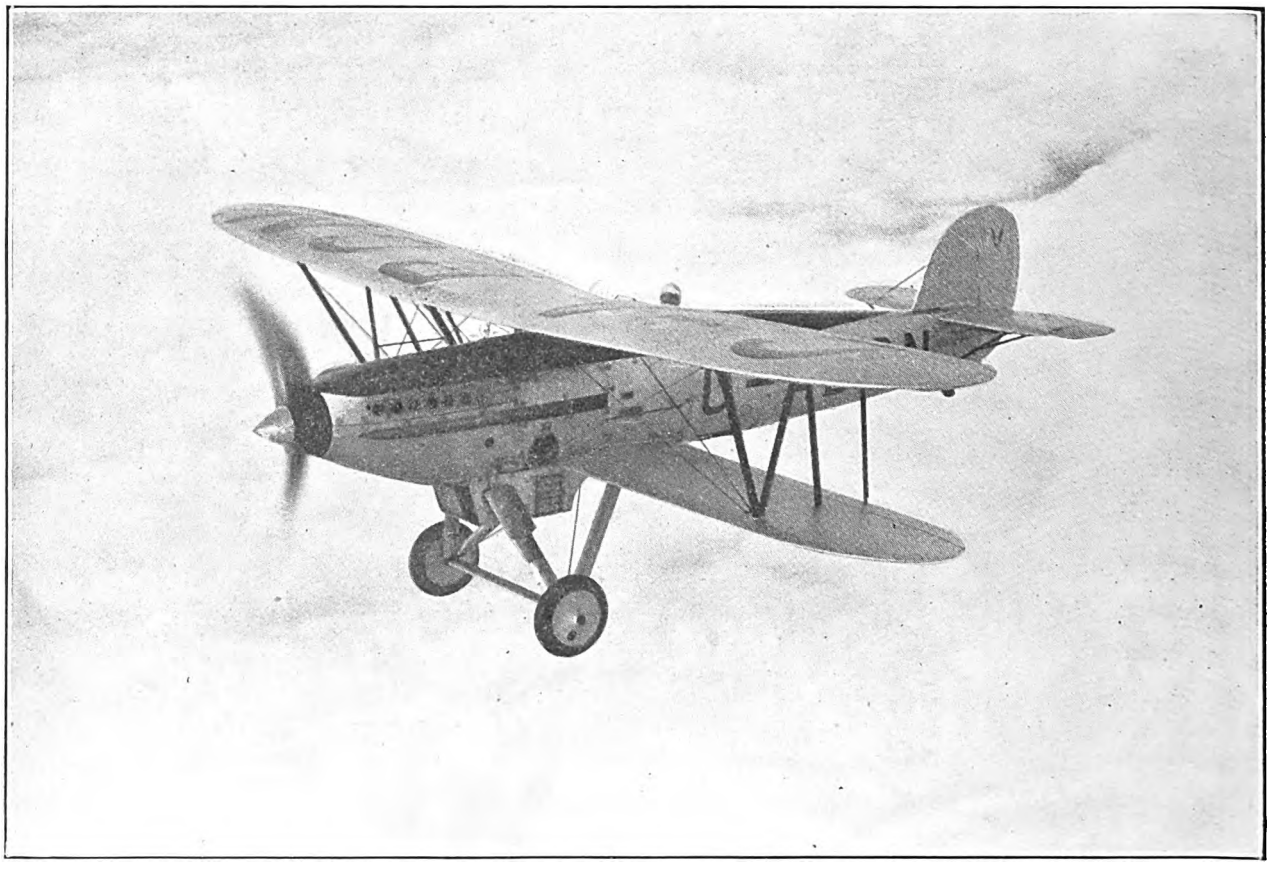
Air Chief Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O., will lay a wreath at the foot of the R.A.F. War Memorial, Victoria Embankment, on behalf of the Royal Air Force and of the Executive Committee of the R.A.F. Memorial Fund on Sunday, Nov. 9.

The Committee of the Fund will welcome the attendance of R.A.F. personnel at the ceremony. Service dress should be worn.

### Anti-Aircraft Defence.

A new drill-hall, the Headquarters of the 312th Anti-Aircraft Searchlight Company, R.E., was opened on Nov. 1, at Upminster, Essex.

Lord Marley, the Parliamentary Under Secretary of State for War, who performed the ceremony, said that this Unit existed for the defence of the Port of London against air attack.



**A VERY FAST SINGLE-SEATER.—The Fairey Firefly (Rolls-Royce "F" engine) for which the claim is made that in official tests it has been proved to be faster than any other fighter.**—(*"Aeroplane" photograph.*)

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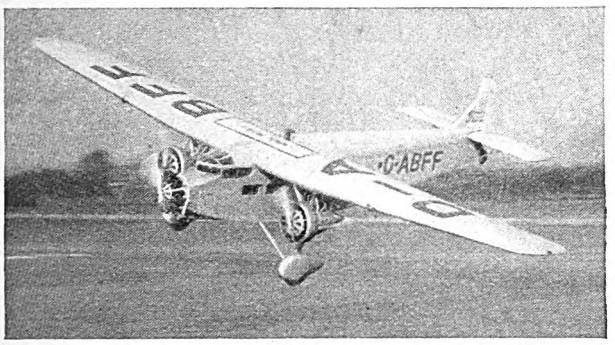
# THE DIRECTORS OF ONE COMPANY fly 97,087 miles




ONE great international business organization owns 3 Ford three-engined all-metal aeroplanes. The directors of this Company, using the Ford Aeroplanes for business trips, have flown 97,087 miles. In one half-year period one of the planes flew on business missions a distance greater than around the world. In addition to these swift, safe business trips, the three Ford Aeroplanes have carried many thousands of passengers to safe destinations.

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675 to 1275.

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Corrugated aluminium alloys; great strength and durability; uniformity ensured by most exacting scientific tests.

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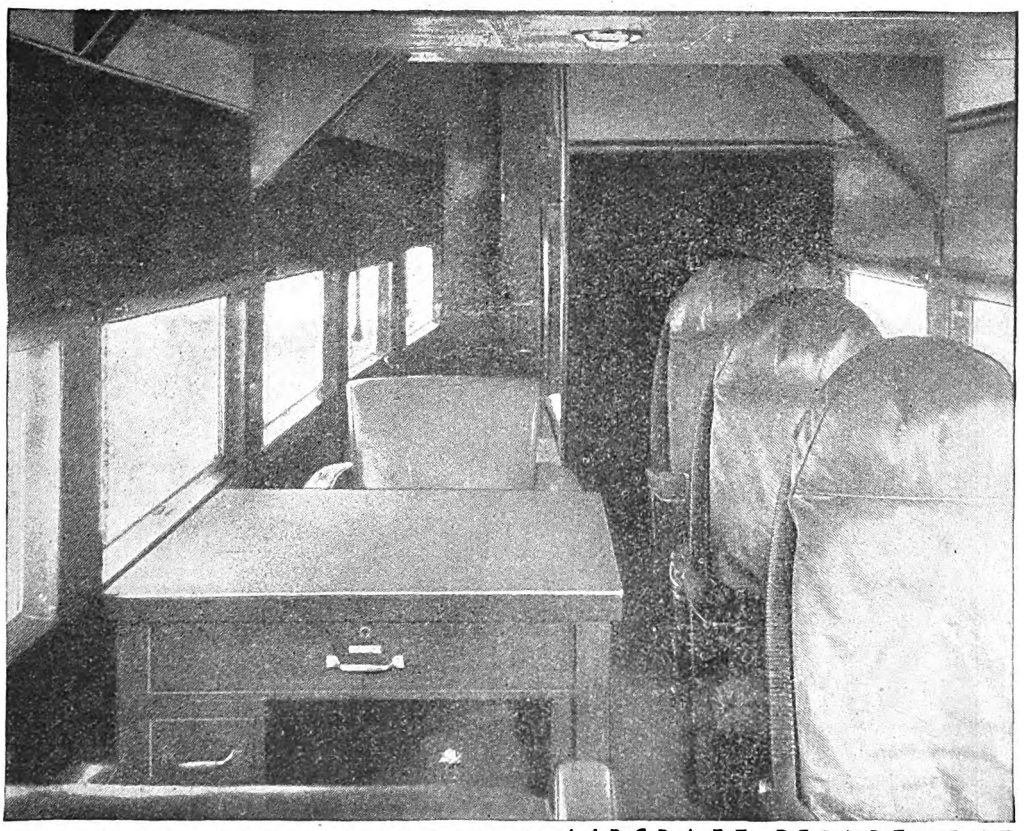
Designed and constructed for the economical transport of passengers, mail and other freights.

**PASSENGERS:**
From 9 to 15, in addition to a crew of 2 (pilot and assistant).



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### The Fleet Air Arm.

The Fleet Air Arm, Royal Air Force, took part in the Display given by the Atlantic Fleet off Portland on Nov. 1 for the Dominion Premiers. Coast defence was represented by a formation of Supermarine Southampton flying-boats of No. 201 (Flying Boat) Squadron, which flew from Calshot alighted off Portland and thereafter circled the flagship from which the Premiers were watching the display.

During the afternoon the aircraft borne in H.M.S. *Courageous* flew off her deck and, after picking up formation, flew past the flagship. Visibility was so bad that a number of the thirty or so machines which had flown off the deck had to alight on shore. One of the Fleet Spotter Reconnaissance machines suffering from engine trouble came down in the water and turned over. Within a few minutes the crew were rescued and the aeroplane sank.

The R.A.F. Units in H.M.S. *Courageous* include three Fleet Fighter Flights, four Fleet Spotter Reconnaissance Flights, and two Fleet Torpedo Bomber Flights. The Senior Air Force Officer is Wing Cdr. R. Collishaw, D.S.O., O.B.E., D.S.C., D.F.C.

### A Naval Occasion.

(*By a Correspondent.*)

Although visibility and general weather conditions were not all they might have been on Saturday last, Nov. 1, they served to demonstrate to the Premiers of the Dominions, Indian Princes and other Imperial Conference delegates, that the Atlantic Fleet of His Majesty's Royal Navy is just as effective in action in foul weather as in fair.

The occasion was the demonstration of Britain's Naval might, or what the Washington Conference has left us of it, to the aforesaid Imperial guests, in the English Channel off the Bill of Portland.

The 300 guests arrived from London by special train at 10.30 hrs., and were conveyed to H.M.S. *Nelson* by the temporary tender *Snapdragon*. The *Nelson* proceeded to sea immediately they were safely on board.

As the *Nelson* steamed away from Portland Breakwater a flight of Southampton flying-boats took off from the open sea, circled her, alighted, took off again, and returned to their station at Calshot. These boats, although they are not attached to the Atlantic Fleet, were demonstrated here because it was not possible for them to be included in the Air Display at Croydon last week.

The next item was the laying and sweeping of mines by the mine-layer *Adventure* and the First Minesweeping Flotilla. These operations were suitably commented upon by our host, a certain Lieutenant who shall be nameless. As the first mine was laid he remarked, "Ah, there she goes, laying her rotten eggs,—not a half-a-crown a dozen, but at hundreds of pounds apiece." Then, as the *Adventure* is the only minelayer in the Atlantic Fleet, someone enquired whether the number of minelayers had been cut down by the Washington Treaty, to which our Lieutenant readily replied, "Oh yes, everything has been cut down,—including my marriage allowance."

Proceeding further into the Channel the *Nelson* was next escorted by two of the latest type submarines, the *Oberon* and the *Proteus*. These craft submerged, one on either side, and came to the surface about three minutes later.

About this time a cheery bugle-call summoned the guests below to an excellent lunch, after which, as the guests were retrieving their overcoats and binoculars, two distinct tremors ran through the ship, these turned out to be the result of a successful submarine attack on the *Nelson* by one of the 2nd Flotilla craft.

As a fitting climax to this torpedo attack, the next item was a Depth Charge attack on an imaginary submarine by three destroyers. These craft dropped 300 lbs. charges, set to explode at a depth of 50 feet, and judging by the shocks felt on board the *Nelson*, one imagines that any fishes in the vicinity who happen to have survived are by now somewhere in the South Atlantic.

At 14.30 hrs., the *Nelson* altered course to the South and passed near the aircraft carrier *Courageous* while she was flying-off her machines. These consisted of one flight of Blackburn Fleet Spotters, one flight of Fairey IIIFs, one flight of Blackburn Torpedo Bombers (Darts), and two flights of Fleet Fighters (Flycatchers).

After flying past the *Nelson* in formation the two Fighter Flights left the main procession and attacked the Battle Cruisers and the Third Battle Squadron. During these operations our attention was drawn to a Fairey IIIF which was attempting to return to the *Courageous*, but was losing height too rapidly to land on her deck.

The pilot continued his glide past the *Courageous*, below the level of her deck, and was severely saturated for his pains. One of the carrier's attendant destroyers was quickly at the scene of the unauthorised bathing party and picked them up unhurt, but the all-metal IIIF is now in residence in Davy Jones' Locker. No information was forthcoming about the cause of the mishap.

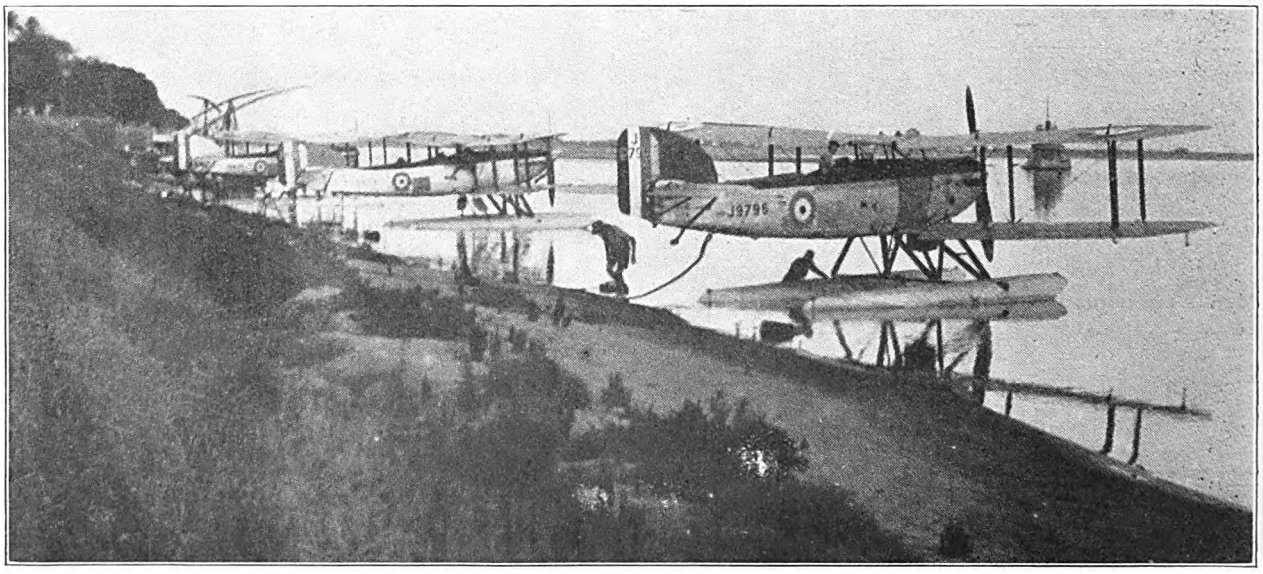
Shortly afterwards a bank of mist which the Fleet was about to enter complicated matters for the aircraft, but the pilots solved the problem on their own initiative, and at about 18.00 hrs. a message was received stating that all aircraft were located and safe at shore stations.

Considering the circumstances, the Fleet Air Arm demonstration was a particularly stout and praiseworthy effort on the part of all concerned.

At 15.00 hrs the mist cleared enough for the star turn of the day to be staged. This was the 15-inch gun concentration firing by the 2nd Division at a target towed by the electrically controlled target ship *Centurion*. A curious phenomenon connected with this event was the appreciable time lapse between the flash from the gun and the corresponding detonation.

The next item was a torpedo attack on the *Nelson* by the 6th Destroyer Flotilla. Unfortunately the destroyers seemed in a hurry to keep another appointment, with the result that they fired out of range, and we were denied the pleasure of watching a direct hit.

The Battle Fleet then steamed past in line astern, and the *Nelson* took station near the 5th Destroyer Flotilla, which was then preparing for a concentration shoot at the *Centurion*, which had now been abandoned and was being controlled from the destroyer *Shikari*. Several direct hits were registered, but the fact that the flames caused by these hits always appeared in one of two places led one to wonder whether they also were not electrically controlled.



**AQUATICS.—Fairey III.Fs (Napier Lion engine) of No. 47 (Bomber) Squadron fitted with floats for work on the Nile and in the swamp areas of the Sudan. A Flight of No. 47 (B) Squadron is making a tour of West Africa and arrived at Bathurst on Nov. 3, a distance of 3,300 miles from their base at Khartum.**

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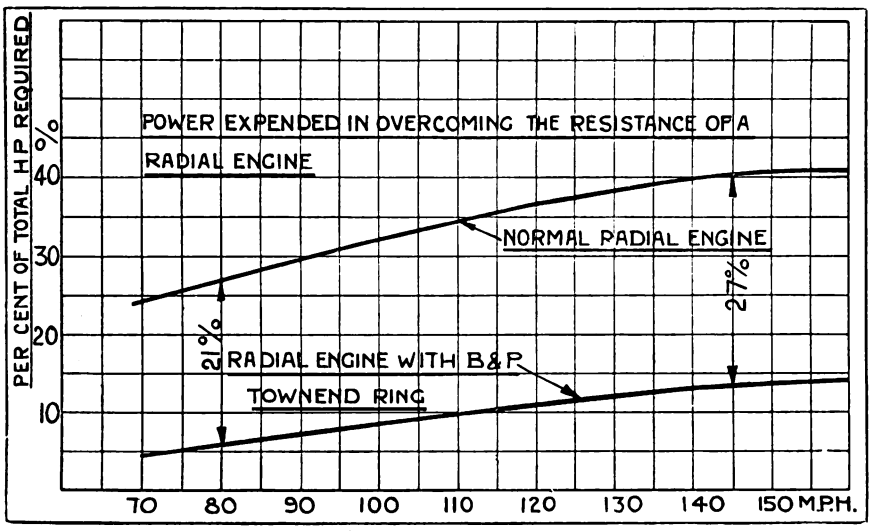


Remembrance Day, Nov. 11th

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**AN INCREASE IN PAY LOAD corresponding to the reduced weight of fuel required.**

***OR***

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**10% REDUCTION IN FUEL CONSUMPTION.**

**10% REDUCTION IN MAINTENANCE & DEPRECIATION.**

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The last item was to have been the *Courageous* flying on her aircraft, but, for reasons stated elsewhere, this did not take place, so the guests went below to tea, or to the bar, as fancy dictated, and the *Nelson* steamed back to the security of Portland Roads.—A. H. L.

### Transfers to the Reserve.

The following officers, serving on short-service commissions, will be transferred to the Reserve on the dates stated. Those marked with an asterisk are not liable for service in the Reserve of Air Force Officers and will therefore relinquish their commissions:—

*Flight Lieutenants*:—*R. K. Emerson, *H. W. A. Fox, *R. W. M. Hall, *E. H. D. Spence, *F. W. Wiseman-Clark (Jan. 3, 1931). A. P. K. Hattersley (Jan. 11). R. F. MacLatchy, M.D., C.M., J. B. Murphy, M.B., B.Ch., L. O'Connor, M.B., B.Ch., J. J. Quinlan, M.B., B.Ch. (Feb. 2). *W. F. Humphery, *M. E. B. P. Storrie, *G. N. P. Stringer, D.F.C. (Mar. 15).

*Flying Officers*:—G. M. Beattie, J. E. A. Binnie, L. S. T. Brown, M. A. Cowan, C. E. Eckersley-Maslin, G. H. Godwin, W. E. W. Grieve, J. E. McC. Henderson, P. A. Moritz, H. T. A. Silcox, C. Warsow, C. D. G. Welch (Jan. 6). A. B. Smith, M.C. (Jan. 14). P. S. Cook, F. Gower-Jones, C. S. John, A. F. Merritt, W. J. Pickard (Jan. 16). *C. H. A. Colman, D. J. R. Hylton, *E. H. Irving, *A. A. Koch, *G. Selk, *F. Townsend (Jan. 17). R. A. Barnett, J. W. Duggan, H. P. Hudson, A. A. Leslie, N. McLeod, R. R. Nash, N. C. Ross-Roberts, S. R. Sherman, G. A. V. Tyson, E. F. Wain (Mar. 13).

An Air Ministry Order warns the following officers that they become due, on the dates stated, to transfer to the Reserve, on completing the active list period of their short-service commissions, or, in the case of the two Reserve Officers, to revert to ordinary reserve service on completing their period of service with the Regular Air Force:—

*Squadron Leader*:—A. Davidson, M.C. (April 25, 1931).

*Flight Lieutenants*:—R. J. I. Bell, M.R.C.S., L.R.C.P. (April 14). G. W. Longstaff (April 25). P. J. Nyham, M.B., B.Ch. (May 2). R. F. T. Grace, M.D., *R.A.F.O.* (May 19).

*Flying Officers*:—J. C. Jeffrey, M.C., *R.A.F.O.* (April 16). A. M. Butt, M. R. Edmondes, C. H. Hockly, A. M. D. Howes, G. H. G. S. Jenkins, W. E. P. Johnson, P. G. Lucas, L. G. Martin, K. C. Netherton, B. F. O. Smith, R. H. C. Taylor, E. D. Turner (May 8). U. S. Mackay (May 30).

A.Os.C. will no longer be requested by letter to notify officers of their impending transfer to the reserve and (where requisite) to forward reports on their ability as pilots. Orders such as this indicating transfers 6 or 7 months ahead will be issued instead every two months, the quarterly orders which have been issued hitherto being discontinued.

### Armament Specialists.

The following officers of the R.A.F. have successfully completed a Specialist Armament Course at the Armament and Gunnery School, Eastchurch, and are entitled to the symbol "A" in the Air Force List—

Flt. Lt. J. C. C. Slater, Flg. Off. H. L. Patch, Flg. Off. H. J. G. E. Proud.

### The Central Flying School Dinner.

Past members of the C.F.S. Staff who have not already advised Flt. Lt. Clarkson of their intention to be present at the re-Union Dinner at Jules Restaurant on November 14 are asked to do so without delay.

The Chair will be taken by Air Commodore N. D. K. MacEwen, C.M.G., D.S.O., and Air Vice-Marshal Sir Godfrey Paine, K.C.B., M.V.O. (R.A.F. retired), the first Commandant of the C.F.S., has announced his intention of being present.

Those responsible for the Re-union hope that as many past members as possible will be present and those who are coming should advise Flt. Lt. Clarkson, 27, Holland Street, Kensington, without delay.

The cost of the dinner will be 10s. 6d. exclusive of wines which will be collected at the dinner. Evening dress with miniatures will be worn.

### No. 3 Squadron Re-Union Dinner.

The eleventh annual re-union dinner of the officers of No. 3 Squadron, R.F.C. and No. 3 (Fighter) Squadron, R.A.F. will be held in the Oak Room of the Trocadero on Friday, Dec. 5 at 19.30 for 20.00 hours.

The Chair will be taken by Air Chief Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O.

Will all members who do not receive the special notice which is shortly being sent to all individuals, please apply to the Hon. Secretary before Nov. 20?

Tickets are 12s. 6d. each including gratuities but exclusive of wines and can only be had from the Secretary and not at the dinner as on previous occasions.

Application for tickets, enclosing remittance, should be made to Flt. Lt. John Oliver, No. 3 (Fighter) Squadron, R.A.F., Upavon, Wiltshire.

### No. 18 Squadron, Re-Union.

The ninth annual re-union dinner of No. 18 Squadron R.F.C. and R.A.F. will be held at the White Hart, 39, High Holborn, on Nov. 8, at 18.00 hours. Tickets, 5s. 6d. each, may be had from the Hon. Sec., J. Fuller, 53, Berkhamsted Avenue, Wembley, Middlesex.

### H.M.S. Engadine Re-Union.

The twelfth annual re-union of H.M.S. *Engadine* is to be held at the Adelphi Hotel, John Street, Strand, on Saturday, Nov. 15 at 18.30 hours. Tickets, 6s. 6d. each, may be had from the Hon. Secretary, Arthur B. Ward, 135, Burbage Road, Dulwich, S.E.21.

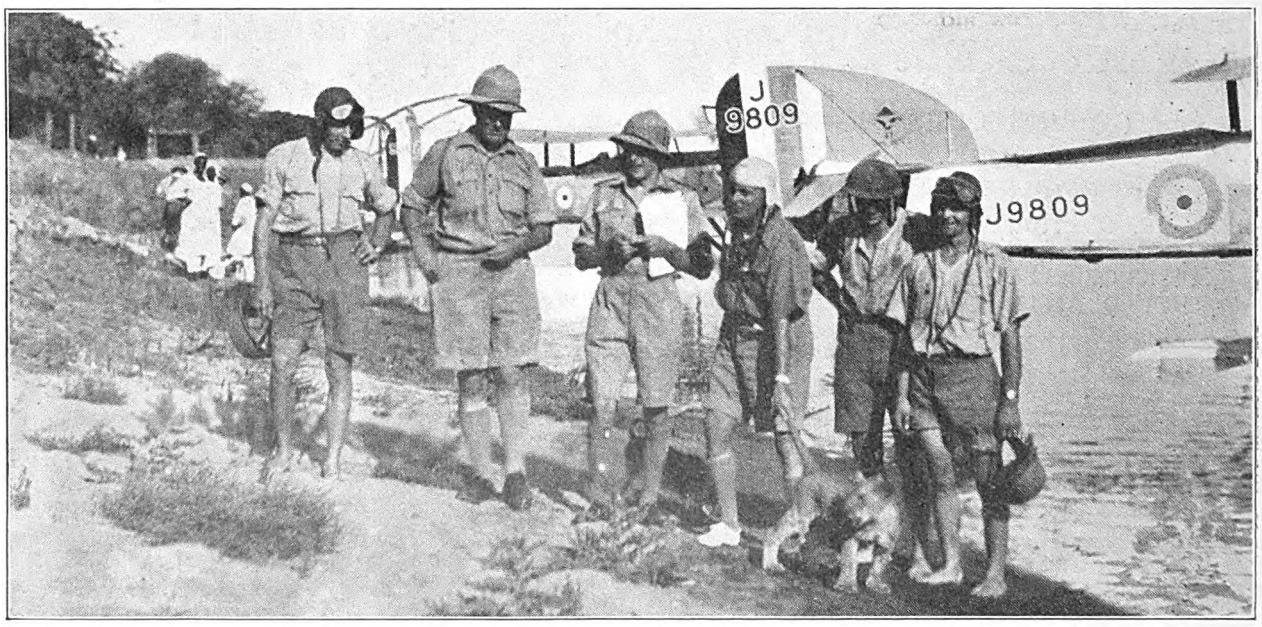
### November Sports Fixtures.

Rugby Football:—*Nov.* 8 R.A.F. College v. R.M.C. Sandhurst at Cranwell. *Nov.* 15 R.A.F. College v. R.M.A. Woolwich at Woolwich.

Association Football:—*Nov.* 8 R.A.F. v. Cambridge University at Woking. *Nov.* 15 R.A.F. College v. R.M.A. Woolwich at Woolwich. *Nov.* 19 R.A.F. v. London University at Uxbridge. *Nov.* 26 R.A.F. v. Spartan League at Hitchin.

Hockey:—*Nov.* 8 R.A.F. "A" v. Tulse Hill "A" at Stanmore. *Nov.* 15 R.A.F. v. Wimbledon at Wimbledon. *Nov.* 20 R.A.F. v. Lincolnshire at Stanmore. *Nov.* 20 R.A.F. v. Beckenham at Beckenham.

Fencing:—*Nov.* 10 R.A.F. v. I.C.U. at Imperial College. *Nov.* 20 R.A.F. v. R.A.C. at the R.A.C. *Nov.* 28 R.A.F. v. Bertrands at Bertrands.




**ON THE BANKS OF THE NILE.—Wing Cdr. W. Sholto Douglas, M.C., D.F.C. (Air Staff Duties, Khartum),—with papers,—Sq. Ldr. E. L. Howard-Williams, M.C. (O.C. No. 47 (B) Squadron),—holding the tail of Belinda, the Squadron's mascot lioness cub,—Flt. Lt. W. A. B. Bowen-Buscarlet, and L-AC.s Steer, Ellis and Chester standing in front of some of the Fairey III.F float-planes of the Squadron.**

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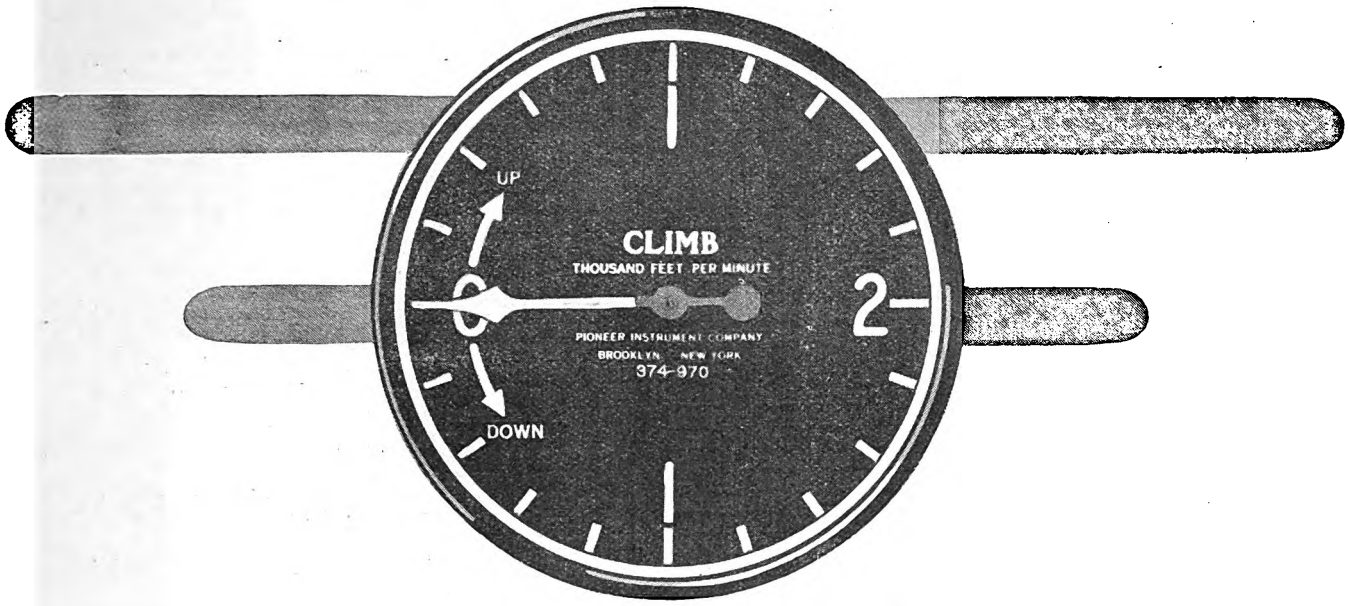


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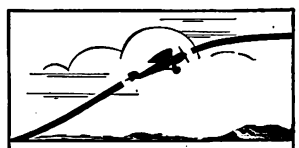
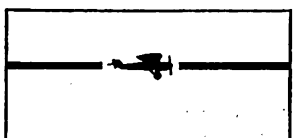
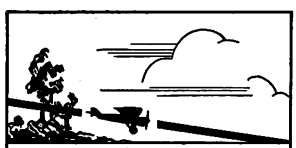

MAXIMUM CLIMB


LEVEL FLIGHT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## DEFENCE AND NOT DEFIANCE.

[*New Wars: New Weapons.* Lieut.-Commander the Hon. J. M. Kenworthy, R.N., M.P. 160 pp. Index. The Library of New Ideas. Elkin Mathews and Marrot. From THE AEROPLANE Book Dept., 3s. 9d. post free.]

The late Lord Wolseley, writing to Queen Victoria in 1885, expressed the following opinion:—"The people of England lack the public spirit that would cause them to support the burden of an army and a navy of a strength commensurate with our duties and responsibilities. No Government, Whig or Tory, has the honesty to tell the people the truth and take them into their confidence on army and navy matters. And when professional soldiers and sailors warn the people on these serious subjects, professional politicians jump up and pooh-pooh all their warnings. The foolish public prefer believing the tradesman who has become a politician to the gentleman who wears your Majesty's uniform"—and these words are as true to-day as they were then.

Although it is the habit of the naval and military hierarchy to deride expressions of opinion on defence subjects by what they consider to be "mere politicians," nevertheless, on occasion, the views of one of these much criticised people is worthy of serious attention. It would be idle to deny,—indeed, he would be the first to say so,—that Commander Kenworthy is an unpopular person with the hierarchy, nevertheless, they cannot deny that his marked ability in controversy is backed by professional knowledge.

Some years ago he published a very interesting book entitled *Will Civilisation Crash?* in which he expressed the fears of all thinking men that another war like that of 1914-21 would mean the end of civilisation as we know it. As a result of this book he was, somewhat unfairly, dubbed a pacificist—using the term as one of opprobium. Now, in this, his new work, which is one of even greater interest, he refutes this charge, and, with cheerful cynicism, he blandly asks us if, as we all say, wars of the future are "unthinkable," then why are we spending enormous sums of money on something which our reason tells us is "unthinkable"?—a question which the "great ones of this earth" will find difficult to answer.

He assumes, as every sensible person does, that a time of perpetual peace on earth is, to say the least of it, improbable in the near future, and, therefore, we must spend a large proportion of our income on means of defence. Granting this necessity, he demands with unanswerable logic that such money should be spent to the best advantage, and he claims, as many others do, that such is not being done at the present time. In his opinion, neither the naval nor the military Staffs have assimilated—nay, even recognised—the lessons to be learned from the last war, and still cling to the belief that the next one will be similar in character to its predecessor.

Commander Kenworthy is known as a trenchant critic of the Admiralty, and he now asks many questions of the Department, the main one being—what is the use of a battleship? We are rather apt to think that this question has only been asked since the Armistice, but students of naval history may remember that two months before the outbreak of war in 1914 a fierce controversy raged on this very question in the columns of *The Times*.

Commander Kenworthy holds that the experience of the war at sea showed that the big battleship was more or less a bluff—and a bluff that was called within a few weeks of the beginning of operations. His critics may deride such an expression of opinion, but he is supported by no less an authority than the late Sir Julian Corbett, who, in the official *Naval Operations*, when discussing the general position of the war at sea between 1915 and 1916, remarked, *inter alia*, that "the Grand Fleet could only put to sea with an escort of nearly one hundred destroyers, no capital ship could leave its base without an escort of small craft, and the German U-boats had hampered our squadrons to an extent which the most expert and farsighted naval officer had never foreseen."

As may be remembered, in March, 1921, the Cabinet decided as a result of "The Capital Ship Committee," that the battleship must remain as the foundation of our sea power, but, with characteristic modesty, they forebore to tell the taxpayer of the country on what grounds they had based this opinion. Now, what the present Lord Chief Justice calls "that important and prevalent person, the man in the street," will be able to form, from Commander Kenworthy's book, his own opinion on the value of the Admiralty's judgment—although the present reviewer is quite sure that the Department would rate the intelligence of such a reader very low, were he to do so."

The author of this little book criticises also the mental attitude of the General Staff of to-day, and seems to think that the policy of mechanisation is one that is, to say the least of it, somewhat short-sighted. This now brings us to the main point of this book, namely that the present policy of sub-division of expenditure and policy concerning our system of national defence is all wrong. He claims that the advent of the air weapon has revolutionised this, and that the Government of the day should consider seriously the general policy of substitution,—that is to say, that all our defence commitments should be examined to see whether or not it is possible in many places to effect great economies by the substitution of air forces for ground or sea units.

The reviewer is well aware that to embark upon this subject at the present time is to cause a bitter controversy, and so he will take the somewhat cowardly line of recommending his readers to read Commander Kenworthy's book. Yet he feels that certain remarks of his own will not be out of place. The supporters of Air Power have to meet with a great deal of unfair and uninformed criticism, mainly because such critics are so prejudiced that they distort the statements of the supporters of such a policy. By the term "Air Power" is meant the ability to intervene in a war from the air, and by the term "air control" is meant a system of government in which the civil power is, in case of necessity, reinforced by the *primary* use of Air Power. No informed exponent of such a system has ever suggested that air units can control a country by itself, for ground troops are required to protect aerodromes, and to maintain law and order in towns; but what they do say is this,—that, provided that air forces are used as a primary striking force, then, wherever such a system has been employed, it has been wonderfully successful and has saved money.

No responsible Air Officer has ever suggested that an air force can maintain law and order in a town, that is a job for policemen. Critics of air control continually harp upon the fact that, as the main weapon of air power is the bomb, therefore the employment of such power is, of necessity, brutal; whereas the whole weight of informed opinion, with ten years of experience behind it, shows that such a belief is entirely unfounded, for the *threat* behind the use of air power is its most potent weapon. In short, air power attains its main object by *moral* effect—a point which Commander Kenworthy illustrates to be the fact.

He ends his book with a plea for a Ministry of Defence, and although most informed people are of the opinion that the machinery of collaboration between the three Services is defective, the objections to a Ministry of Defence are such that it is doubtful whether it will ever come into being in the form that the author of this book suggests, mainly because, human nature being what it is, such a Minister would inevitably be swayed in his considerations of defence policy by whomsoever was the strongest Chief of the three fighting Services. Commander Kenworthy is bound to be criticised vigorously, but he may take heart in the words of Spurgeon—"He that believeth may be bitten, but he that believeth not at all shall be devoured."—S. G.

## A FITTING GIFT.

[*Wind and Water.* Manfred Curry. 28 pp.+120 Plates. Country Life Ltd. From THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, E.C.4. 26s. post free.]

The increase of interest which is being shown in all the works of the air, from the destruction done by hurricanes to the losing of a yacht race through a failing breeze, and from the sinking of an airship to the lifting of a glider, will be stimulated by a study of this beautiful book. The purpose of its informed author is to show the causes of wind and wave formations and how these affect the yachtsman and the aviator.

Mr. Curry first of all discourses on the formation and nature of waves, and expresses the opinion that these are due rather to the suction of the wind eddies, which lift the water upwards, than to the pressure exerted by the eddies upon the surface of the water. Incidentally, he states that there is no doubt that sea-gulls make use of these upward currents when gliding. We are all of us interested in waves, and always solemnly tell each other that "the seventh wave is always the largest," and Mr. Curry tells in simple and accurate language the causes of this repetition. He then explains concisely the causes of wind and wind formation and how these may be applied to an increase of skill on the part of the yachtsman, and thus, by inference, to him who soars in a sailplane.

The main attraction of the book will undoubtedly lie in its truly magnificent illustrations. These have been collected from various parts of the world, and are perfect examples of the true illustration, that is, using the word in its correct sense, namely, in elucidating the text. The whole book is most beautifully produced, and will make a really fine work of reference. The impecunious and interested would be well advised to be pleasant to the wealthy in the hope that they may have a copy of *Wind and Water* as a Christmas present. The present reviewer makes this remark in all sincerity, in that a hard and stern Editor has ruthlessly decreed that the review copy must be returned to him!—S. G. [Strictly as a work of reference.—ED.]

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# ZENITH CUP

# WON AT 112 MPH AVERAGE FOR 1,036 MILES

THE WORLD'S PREMIER LIGHT AEROPLANE

DH MOTH

THE Air Race round France for the Zenith Cup has again been won by Moth. This year the winner was M. Edward Bret, flying his Moth with a de Havilland Gipsy II Engine. His average speed of 112 m.p.h. round the 1,036 miles course included five compulsory stops.

Second prize was also won by Moth (Gipsy I Engine.) No other competitors finished the course. This performance affords a striking demonstration of consistent speed and reliability combined in one aircraft.

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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### AN AUSTRALIAN OCCASION.

By far the biggest and most successful event staged in Australian aviation was the N.S.W. Aero Club Pageant at the Hargrave Air Park, Sydney, New South Wales, on Sept. 20. The day was perfect and the crowd enormous, according to the correspondent of THE AEROPLANE.

In the morning four races were flown on Club machines which had been previously run over a measured course to help the handicapper. Most of them yielded very close finishes among the early starters, but the tendency of handicappers in general to be hard on the scratch men had its effect. The times were fair, and the accuracy of the 10-mile course is a little questionable considering the excellent cornering.

G. F. Hughes, President of the Club, won the fastest race of the day for the Moths, which was the Public Schools handicap open to pilots who were members of any of the recognised public schools in N.S.W. His average was 92 m.p.h.

An event for model aeroplanes was quite interesting. One model made a flight of about 3 minutes at a great height, and another seems to have shown a bent for crazy flying.

The Neil Stewart Memorial Trophy race over a 50-mile course was won easily by Major Hereward de Havilland in a Puss Moth. Mr. Hall was second in an Avian (Genet).

In the Ladies' Race for the Trophy presented by Miss Amy Johnson the handicapping was the best of the day and the four entrants finished within a second. Miss F. Deaton won.

### THE WEEK'S WANDERERS.

Mr. Oscar Garden, whose start to Australia was marred by a forced landing in Kent in the middle of October, is now making good progress. Incidentally, he went back and started afresh from Croydon.

After an unheralded course across Europe and Asia Minor he got to Karachi on Oct. 28, flew to Allahabad next day and on to Jodhpur. He tried to reach Jhansi, but was forced down by darkness, and did some damage to his Moth (Gipsy I). The following day he was able to continue to Jhansi and Calcutta, where his machine was repaired. He was there on Oct. 29, when Mrs. Victor Bruce dropped in on her tour to the East.

He covered the distance to Rangoon and Singapore between then and Nov. 1, and the following day he arrived at Batavia.

On Nov. 4 Mr. Garden got to Port Darwin, Australia, 20 days after his second start from Croydon. So, in spite of taking his time, and doing short hops, he was no longer getting to Australia than the best ships are getting to India.

Mrs. Victor Bruce, who damaged her Bluebird (Gipsy II) near Jask on Oct. 5, took time off in that city and had things put right. More or less silence prevailed until Oct. 27, when she arrived at Karachi, and since then the Bluebird has shown a burst of speed. The time-table reads: Oct. 29, Calcutta; Oct. 30, Rangoon; Oct. 31, Bangkok; Nov. 1, left for Korat.

### HANWORTH HARD AT WORK.

In the last three months 51 members have qualified at the Hanworth Air Park of National Flying Services. These were distributed as follows:—Aug. 24, Sept. 17 and Oct. 10. The number of licensed pilot members is now 169 at the Hanworth Club, with the total membership at 1,030, of whom 572 are actively flying.

**RAPID DELIVERY.—Mr. R. F. Caspareuthus descending at Cape Town from the door of the Puss-Moth which he flew from London for Mr. Marshall of Port Elizabeth.**

The members have flown a total of 6,000 hours during the past year, and Flt. Lt. Max Findlay, the chief instructor, has spent 800 hours in instruction, taxi and test during that time.

Overseas members of the Club include 16 nationalities, and these have taken 34 of the 169 A licences. Their influence in favour of British aircraft when they return to their own countries is a noticeably good thing for the British Aircraft Industry.

The total membership of the six N.F.S. clubs is now 1,707, of which 975 are active flying members, 266 licensed pilots and 56 private owners.

**A GOOD WEEK'S WORK.—Mr. R. F. Caspareuthus landing the Puss-Moth (Gipsy III) at Cape Town after setting a World's record from London to Cape Town in eight days.**

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### SUN SHINES.

On Oct. 31 Mr. Siang Tsi Sun, the only one of the Chinese members of the Cinq Ports Flying Club still in training, went solo after many hours of dual during which he imbibed instruction from Mr. K. K. Brown largely through the medium of strained and eloquent silences. He put up a very good show on his first flight alone, and liked it so well that he flew for an hour and a half with occasional landings to make sure that he could get down if he wanted to.

Considering their total lack of verbal expressions in common, both he and Mr. Brown deserve a good deal of credit.

The Club has gained two new A licence pilot members during the week in the persons of Mrs. Atkey, of Nonnington, near Dover, and Mr. A. F. L. Clive, a member of the Household Brigade Flying Club. Both took their training at Heston.

### THE CIRCUIT OF POLAND.

There has just been held in Poland the third Polish light aeroplane contest, called officially the Krajowego Konkursu Awionetek, for which there was a total of nineteen entries, of which fourteen were in the first F.A.I. category for two-seat light aeroplanes, weighing less than 480 kgs. (880 lbs.), and five in the second category for two-seat light aeroplanes weighing less than 280 kgs. (620 lbs.).

All the entries were of Polish design and construction, but, with the exception of two, all were fitted with engines of foreign design. In the heavy category eleven were fitted with British engines, of which four were 105 h.p. Cirrus-Hermes, two 85 h.p. Cirrus III, three 80 h.p. Armstrong Siddeley Genet, and two 85 h.p. D.H. Gipsy. In the light class four out of the five were the famous little 40 h.p. Salmson radial engine.

The competition was run on lines very similar to those of the Round Europe Contest, that is, in addition to the Circuit there were various tests to determine speed, climb, fuel consumption, comfort, etc.

In the Heavy Category R.W.D.4 monoplanes (Cirrus-Hermes engines), flown by MM. Zwirko and Grzeszczyk, were first and second, and the remaining two of the four R.W.D.4 monoplanes entered came fifth and sixth.

In the Light Category the only four finishers were the four R.W.D.2 monoplanes (40 h.p. Salmson engines) entered.

The R.W.D. monoplanes will be remembered by all those who followed the Round Europe Contest this year by their nickname of "Blind Mice."

The success of the Cirrus-Hermes in this contest is very gratifying. This competition brings to a close a season which has been an outstanding one for Cirrus engines. Their other successes include the winning of the Britannia Trophy for the third year in succession, the winning of the King's Cup for the third year, the winning of the Siddeley Trophy for the third year, and the winning of the Grosvenor Cup for the third year.

### A SEA-GOING FLYING CLUB.

The gargantuan task which an organisation such as the Singapore Flying Club faces is well set forth in their report for the first half of 1930, and only the most spirited and energetic management could have overcome the difficulties and evolved a routine which is giving results—albeit at great cost of time, money and labour.

The Singapore Club uses Moths exclusively, and on floats. Their troubles to start with were discouraging in the extreme, as they found that these craft needed a good deal of modification before they were suitable. This was caused by the enforced water-operation, which is more difficult than land-operation in many ways, and particularly those ways which most affect learners. Furthermore, the sea is highly salt, the weather humid and mostly hot, so that the aluminium parts were eaten away in a few weeks by corrosion, the wood rotted and disintegrated and the fabric deteriorated.

By means of replacing aluminium parts with phosphor bronze, renewing wooden parts as soon as they show signs of wear, and re-covering the lower wings and tail-planes every year, the machines have been kept in service. The overhaul programme is so searching that spare wings and undercarriages are always kept, so that these parts can be done thoroughly without holding the machine out of service too long.

When an unfortunate incident occurs the machine usually overturns and only the floats remain visible. This means rebuilding the aeroplane completely as the effects of water-logging are disastrous. After every day's work the aeroplanes are hosed down with fresh water and dried off.

Nevertheless the Singapore Club can turn out a student formation on suitable occasions, and Mr. S. H. Potter, pilot-instructor, reports 12 "A" licences and several members ready for solo.

### ENCOURAGING THE GERMAN OWNER.

The whole fabric of British Light Aeroplane Clubs and their attendant entourage of private owners is quite certainly the envy of the whole of Europe. Even in the United States there is nothing quite comparable to it.

Various attempts have been made to foster a similar growth abroad. Quite recently an attempt was made in France to encourage the private owner. The French Government announced that they would contribute towards the cost of a light aeroplane on a certain predetermined schedule. For a conventional light aeroplane this contribution worked out at about £400. The French Government also announced that they would contribute towards the up-keep. No figures have yet appeared to show the effect of this subsidy.

Now a similar attempt to increase the number of private owners has been made in Germany. The Deutscher Luftfahrt-Verband, or German aviation association, which is the central organisation of all the aviation clubs and similar bodies in Germany, has offered to supply to affiliated associations, flying clubs, and their individual members the 20 h.p Mercedes-Klemm at half-price. This is £172 10s.

This is certainly a very low figure, but, as the *Börsen-Courier*, according to *The Times*, points out, the real cost of owning and operating an aeroplane lies not so much in the first cost as in the operating and maintenance expenses. Until these are reduced flying will remain a rich man's pastime.

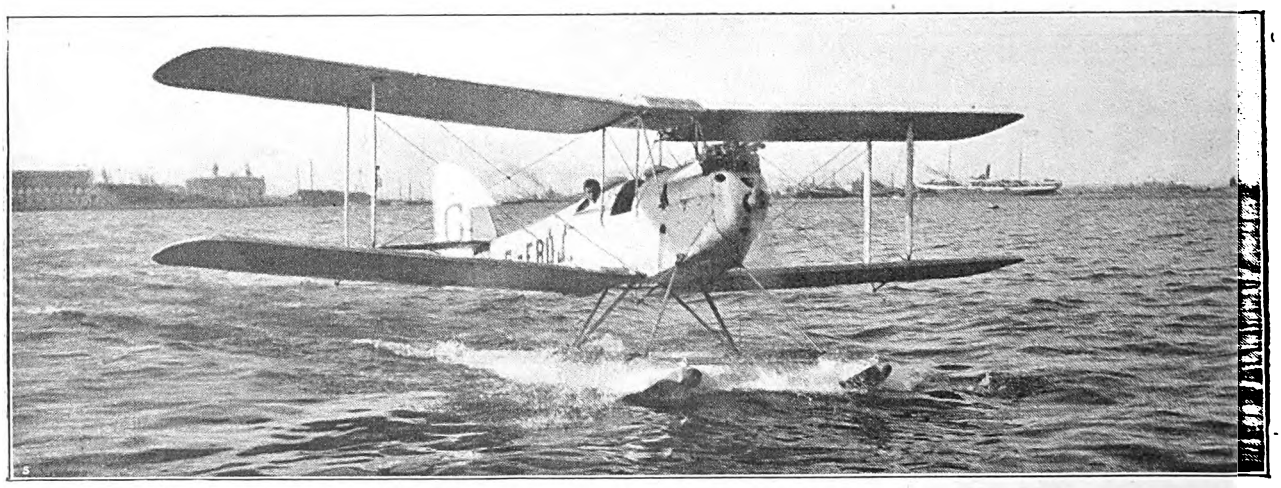
### SOLVENCY IN NORTHANTS.

The record of the Northamptonshire Aero Club for the past year is eminently satisfactory in that they made a profit of £26 and trained ten people as far as the "A" licence with two machines. An epidemic of broken longerons caused six withdrawals from service between February and September so that the equipment rarely exceeded one flyable aeroplane.

In view of an imminent decrease in subsidy a larger profit might have been better, but the purpose of a Flying Club is to fly inexpensively and not to pile up a surplus beyond a reasonable reserve. And few there be that balance up!

### COSTING MORE.

As the subsidy subsides the rates rise. This is going to be more or less plain arithmetic among the flying clubs as the fatal day draws near. The Norfolk and Norwich Aero Club, where the cheapest instruction and flying in the World has held sway for some time, now announce that their flying rates are raised to thirty shillings per hour for dual and solo.



**A LIFE ON THE OCEAN WAVE.—One of the long-suffering seagoing Moths (Cirrus) of the Singapore Flying Club.**

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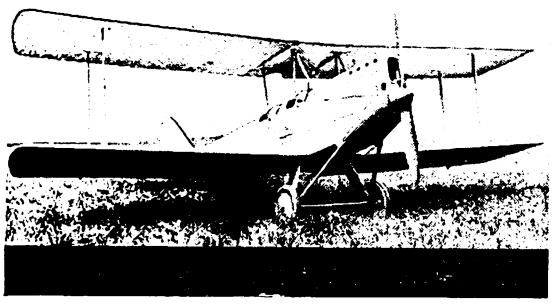
# KINGSFORD-SMITH WIRES:



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54. Metal Moth. Gipsy I. 100 H.P. Compass. Slots. Special windscreen. 260 hours, 12 months C. of A. ... ... ... ... ... £525
55. Metal Moth. Gipsy I. 100 H.P. Compass. Slots. Extra tank. C. of A. 5 months. 130 hours ... £575

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| Mark IV.M, metal fuselage... ... ... | £795 |
| Mark IV.M, Sports Model ... ... ... | £825 |
| Mark IV. Metal Sports Gipsy II. ... ... | £875 |

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## MYSTERY AIRMAN'S FEARLESS FLIGHT.

*(By Our Special Art-Student of The Manners and Customs of the Daily Press.)*

The *Daily Error* is able to reveal for the first time details of an amazing plan to win final and unchallenged supremacy for British airmen and British aircraft.

The identity of

THE INTREPID BIRD-MAN

must for the moment remain veiled. This much may be said. He is not only a well-known club man in the West End but he is a distinct influence in the City. He works himself as hard as he works others, is an early riser, and is frequently found at his desk before luncheon.

Yesterday a representative of the *Daily Error* found him putting the final touches to his machine. Determined to keep his identity secret he had not only secreted his identity about his person but was

HEAVILY MASKED

and wore a pair of obviously false side-whiskers.

He was simply dressed in a suit of blue overalls, his only ornament being a massive scarf pin of lapis lazuli set in an effective border of brilliants and verdigris. This pin has a romantic history. It was presented to the mysterious aviator by no other person than

PRINCE AXEL OF GREECE

as a token of gratitude for saving his life three years ago and bears the simple inscription "Axel Greece" on one side and "Woolworths" on the other.

I am able to reveal for the first time the story of the rescue. It transpired at the Adlon Hotel in Berlin where Prince Axel lay at the point of death on the very morning of the imposing ceremonial that marked his nuptials to Princess Inbred of Schrecklich-Hangover.

PLACING A WET TOWEL

over his face, our chivalrous cavalryman of the clouds rushed into the young potentate's chamber and offered him a Prairie Oyster.

This morning (writes our Correspondent yesterday) I found him wrapped in contemplation of the ordeal to come.

"YOU MAY AS WELL KNOW MY PLANS,

he said curtly. "Roughly, my idea is to fly to Paris in ten days. I realise that Civil Aviation is still in its infancy, but I am convinced of its vast potentialities and am determined

"TO PLACE OLD ENGLAND ON THE MAP.

"My first hop should take me as far as Biggin Hill. After all there is nothing like a good Biggin-ing, is there? (he added, laughing heartily and wearing a red carnation in his button-hole). After that, all will depend upon the weather."

"Dangers? Ah yes, I know the dangers. Those whitebait on the Goodwin Sands . . . . those mountainous waves of nausea in mid-Chanel . . . . those sharks at le Touquet . . . . You may notice that I do not pronounce the second "N" in Chanel. That is to put you newspaper men off the scent."

"HOSTILE NATIVES AT WHITSTABLE?

I am not afraid of them. Mindful of the recent ordeal of one of our intrepid British bird-women who only escaped death by dancing to the shrill cacophony of her alarum clock, I am taking a correspondence course in the midway rhythm, and a gross of cuckoo clocks that lay eggs every time they strike the hour."

"Otherwise I am travelling light as I am determined that nothing shall interfere with the secrecy of my venture. All my luggage will consist of a small suitcase, in which I shall have a thermos flask full of gin and Eno, a packet of sandwiches and (of course) Lord Castlerosse."

"There is no question of commercialism or advertisement about my flight, which is solely designed to aid the cause of Civil Aviation which I realise is still in its infancy. But I may as well tell you that Lord Wakefield is supplying the oil for the tour; Lord Beaverbrook has kindly lent Viscount Castlerosse; Messrs. Gordon—true to the old hymn that 'the cocktail's one foundation is Gordon's London Gin' are letting me have my drinks; my Tipsy Moth aeroplane comes from Messrs. Moth Brothers, and my whiskers are by Willy Clarkson."

Such is the story of this epic adventure told by the epic adventurer himself.

HE KNOWS NO FEAR

and this is by no means the first desperate undertaking that he has undertaken.

In the World War, when Britain fought to create a country which only heroes could live in, he was in charge of that ill-fated attempt to transport surplus blankets from the Portuguese troops in France to General Mangelwurzel's White Russian Army which was marooned on an ice floe.

One day he was flying his usual load of blankets when he failed to notice that one of them was infested with vermin. Choosing its opportunity it leapt at him while he was studying a map, and smothered him in a vice-like grip. Nothing daunted he released the clutch of his parachute and leapt into some vacant space that was luckily to let near by.

I am also able to reveal for the first time details of an amazing flight that he carried out in New York last year. Taking off from Welfare Island he flew upwards and backwards over Queen's Bridge, effecting a landing on Welfare Island only a minute and a half later.

This miraculous flight, proving that although Civil Aviation was still only in its infancy it had unlimited possibilities, never received due recognition mainly owing to the jealousy of the American press. But

THAT NIGHT

there was a complementary supper party at Childs' cafeteria on Madison and Thirty-fourth (where smart New York gathers in all its corruscating scintillescence), and American heroes on wind and water joined to do the airman honour.

"I have nothing on you, Kid," averred Colonel Charles Lindbergh.

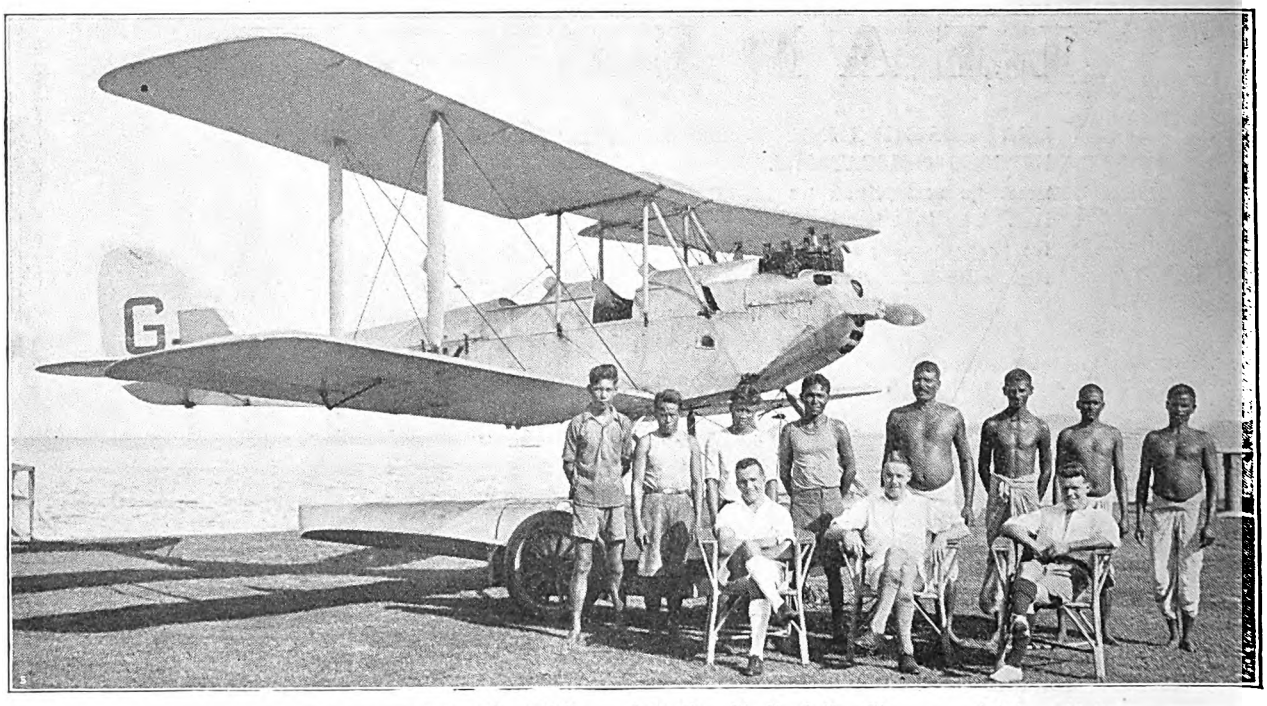
"I have nothing on you," added Mr. R. T. Jones, jnr. (known to a few chosen intimates as Bobby).

"I have nothing on," said Miss Ulula Lingerie, of the Follies.

ANOTHER GLORIOUS CHAPTER

had been written in the history of Civil Aviation which is still only in its infancy after all.

Who is Britain's Galahad of the Cirro-Cumulus? Read Dames Jugglers' powerful article in the *Suppress* next Sunday.




**IN THE KEY TO THE EAST.—The White and Native Staff of the Singapore Flying Club.**

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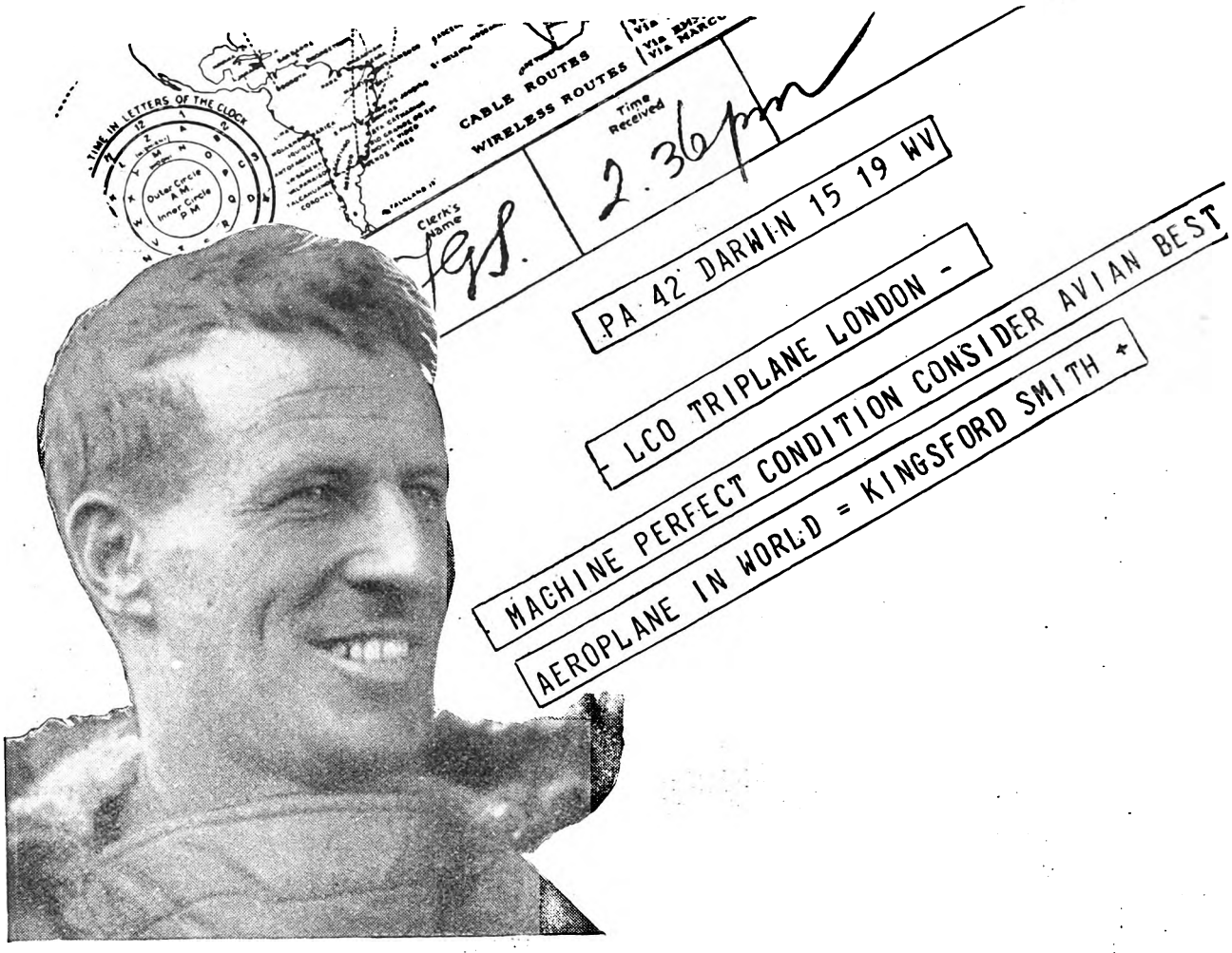


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# COMMERCIAL AERONAUTICS.

## THE PURCHASE OF NAVAL AND MILITARY AIRCRAFT.

BY CAPTAIN GERALD N. DEANE, A.M.I.C.E., A.M.I.Mech.E. (late R.E., R.F.C., and R.A.F.).

Nothing can be more confusing to an Air Force buying executive than the claims put forward by manufacturers of various Nations regarding their respective products: consequently the greatest acumen, experience and technical knowledge, must be exercised in the purchasing of military and naval aircraft.

Of all the factors contributing to military superiority, weapon-value must be held of greatest strategical importance, and the most successful purchasing authority is that which has developed the power to appraise such factors whose relative value cannot be computed in exact mathematical terms.

The necessary sense of judgment is developed by collecting information, and together with a little observation and imagination, applying it to the strategical considerations, which at the outset ought to be thoroughly understood and explained by the purchaser to his prospective suppliers.

In all instances where we are thrown into competition with Continental or American interests, one is frequently informed that British machines are expensive. But, if an impartial record were kept of the number of flying hours carried out in countries where both British and foreign-made aeroplanes operate side-by-side, the former would be found to outclass the latter completely in this category of military efficiency. And the results gained by operating British machines, developed under continual *active* Service conditions, will invariably justify the original capital outlay, and demonstrate the definite superiority they are purchased to effect,—that at any rate is what we are told by people who possess mixed equipment.

In purchasing aircraft, attention to the following will repay the study involved:—

*Strategically.* The aeroplane must possess:—

(1) Attacking power.

(2) Unquestioned superiority of performance, not only on paper, but also in the air.

(3) Full manœuvrability and handling qualities.

(4) Maximum duration without impairing the performance which has been aimed at in the design.

(5) All-round visibility.

and (6) be capable of dealing with the necessary military load.

*Constructionally.* The best compromise must be fixed between:—

(1) Absolute safety throughout a complete range of duties.

(2) Positive reliability against failure in both the power plant and aeroplane structure.

(3) Unquestionable robustness.

and (4) a high standard of interchangeability between units.

*Maintenance.* Of greatest importance is:—

(1) Simplicity in construction.

(2) Ease of manipulation, combined with a low minimum wear-and-tear factor on controls.

(3) A well-balanced obsolescence/depreciation characteristic.

and (4) Interchangeability amongst an economical range of spare-part groups.

*Mutual Confidence.* An undertaking to supply, demands:—

(1) A thorough understanding between purchaser and supplier as to what is required.

(2) Incontestable contract agreements, combined with an essential reasonableness in their interpretation.

(3) Guaranteed inspection and performance tests.

(4) Service after sale.

*Finance.* Unless the above conditions are satisfied, the lowest priced offer is expensive.

The continual recasting of ideas developed under active Service conditions, necessitates periodical re-equipment of units with up-to-date types, and in order to maintain the highest standard of superiority, these are rarely permitted in this country to reach the so-called mass-production stage.

The production of modern British Service aircraft is based largely on almost unlimited research, and the accumulation of practical experience. These factors combined with the latitude allowed designers in giving their imagination full play, result in a very perfect apparatus being evolved.

In the competitions for R.A.F. contracts, which are constantly taking place, the capabilities of the machines built to the above scheme and submitted to the Government, are thoroughly investigated. Every opportunity is given to demonstrate their individual superiority. The onus of proof is shared by the manufacturers and the Government conjointly. The tests are of a somewhat protracted and expensive nature, but the advantages gained outweigh the occasional inconveniences, and are definitely reflected in the quality of the final product.

Cases occur where the high standard reached is of such a remarkable character that selection is extremely difficult. Our Authorities, nevertheless, reserve the right to turn down all competitive types, and withhold production if policy warrants such a course.

The British designer nowadays endeavours to insure against the possibility of such a risk as the latter occurring. In any case he can now guarantee that when his product emerges, its capabilities will be in excess of the Government specification and requirements.

In the last fifteen years, the performance of Service aircraft has improved over one hundred per cent. in practically every direction.

This is partly due to a general reduction in head resistance or initial drag, for which improvement the low frontal area of the modern liquid-cooled British aero-engine is largely responsible. It is a notable fact that certain Nations who have hitherto concentrated on medium-powered air-cooled types for Service aircraft, have suddenly realised the position at present occupied by the British Nation, using the higher-powered liquid-cooled units for all their super-performance types. [The American Government have recently purchased from a British firm, three liquid-cooled H type engines; this contradicts a declaration made some two years ago, that wherever possible, U.S. Service aircraft were to be engined with air-cooled radials as standard.]

Furthermore, a fifty per cent. reduction in weight per horse-power during the same period, has assisted in the all-round increase in efficiency, and with a corresponding economy in fuel-consumption of about thirty per cent., has tended to either extend the range or add to the useful load, while substantially lowering operational costs.

Except for the purpose of coastal defence or long-range night-bombing excursions into enemy territory, the policy here has been to sacrifice duration in favour of high performance. The strategical element of surprise introduced by the employment of daylight bombing formations necessitates such a high degree of mobility that any range of more than 750 miles must be considered superfluous.

In counter attacking these bombing formations, the high-performance interceptor fighter unit is the present solution, and as offensive operations constitute the most important factor in defence, a margin of superiority of at least twenty per cent. in speed, climb, and manœuvrability is necessary to force a successful conclusion.

Summing up it must be emphasised that in all combatant operations, weapon-value rather than skill in the personnel, the latter's *moral*, or concentration of numbers, is the principal factor to success, and is the one thing that will mostly decisively affect the final issue.

That the British at the present time possess a margin of matériel superiority in excess of their foreign contemporaries, admits of no possible doubt, and it is only necessary to demonstrate the capacity of the latest British types to satisfy the most critical Service mind that this is undoubtedly the case.

Though a demonstration carries the utmost conviction with it, it is nevertheless necessary for the purchasing Authority to receive a report on practical tests carried out by one of its own test pilots. And, if serious purchasing is really contemplated, encouragement will always be given to overseas Governments to reach a decision mutually agreeable to everybody concerned.

## THE SUMATRA-HOLLAND RECORD.

Reference was made last week to the quick transit of a letter from Medan, Sumatra, to this office, when it arrived in ten days from the date of posting. We now learn from Holland that the Fokker monoplane in which Messrs. Van Dyk and Wiersma brought the first Air Mail from the Dutch East Indies took only 8½ days from Bandoeng to Amsterdam. Allowing that Amsterdam is practically the same distance from Bandoeng as London is, that makes their rate of progress rather faster than Wing Commander Kingsford Smith's trip to Australia. It is a record which will take a lot of beating by any air-mail service.

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## TESTING AEROPLANE CONTROLS.

On Thursday, Nov. 13, Mr. H. L. Stevens will lecture before the Royal Aeronautical Society in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 18.30 hrs.

The lecture, which is entitled "Testing Aeroplane Controls," will deal not only with the methods of testing controls at Martlesham Heath, but will suggest what are the lines of development for improving control.

To quote Mr. Stevens' words:—"In such a controversial subject I can hardly expect that my opinions will be generally concurred in, but I hope they will result in others with more experience coming forward to join in the discussion."

## A NORTHERN CENTRE OF LEARNING.

Everybody who went to Mr. Fairey's lecture recently will remember the striking point he made about the growth of the membership of the Royal Aeronautical Society. This is due in no small way to the sound policy which the Society has followed in forming Branches.

One of the healthiest of such Branches is that of Hull and Leeds. Not unnaturally a large number of people in the Blackburn Aeroplane and Motor Co. Ltd. are members of this Branch, which is under the able Chairmanship of Major Bumpus,—who has Major Rennie as his Vice-Chairman.

Regular lectures are given before this Branch of the Society at University College, Hull. The following lectures have been arranged for the coming session:—

On Nov. 28 Mr. H. Glauert will read a paper on "The Importance of the Boundary Layer."

On Jan. 2 Mr. J. E. Ellor, who is Chief Experimental Engineer to Rolls-Royce Ltd., will read a paper on "The Evaporative Cooling of Aero Engines." Colonel The Master of Sempill is to lecture on "Gliding and Soaring" on Jan. 30.

Mr. Sutton, of the R.A.E., is to lecture on Feb. 27 on "Aircraft Light Alloys." On Mar. 27 Sq. Ldr. A. H. Orlebar is to lecture on "The Flying of High Speed Seaplanes."

Any person who is interested in Aviation can become a member of this Branch on payment of an annual subscription of 5s. The Hon. Sec. is Mr. G. B. Fenton, c/o Fairview, Brough, East Yorks.

## KEENNESS IN KENYA.

Wilson Airways, Ltd., incorporated in Kenya Colony and based on Nairobi, is doing an excellent job of work in regions of which the ordinary Britisher in the street has little conception.

The company owns two Moths, and one of them, VP.—KAC, has been flying for 17 months and has 600 hours to its credit. The other was once Mrs. Wilson's private Moth, VP—KAG, but was taken over by the Airways and has now flown 400 hours.

The other aeroplanes used are Avro V's (three Genet Major engines), and VP—KAE, *Knight of the Grail*, did 218 hours flying in the first four months under charter to the Imperial Airway Survey party. It was afterwards exchanged for G—ASSO which had been a familiar sight at Heston for a month or so previously.

The other Avro V, VP—KAD, *Knight Errant*, has flown 150 hours.

While these machines were on overhaul or otherwise employed the Company has chartered a Moth owned by the Aero Club of East Africa and flown it for 150 hours. A Fokker Universal is also owned by Wilson Airways.

All the machines have been flown between Kenya and England by either Flt. Lt. F. A. Swoffer or Mr. T. Campbell Black, managing director of the Company. He says three engines add enormously to the comfort of hopping from Catania to Homs on the trans-Mediterranean stretch of the journey.

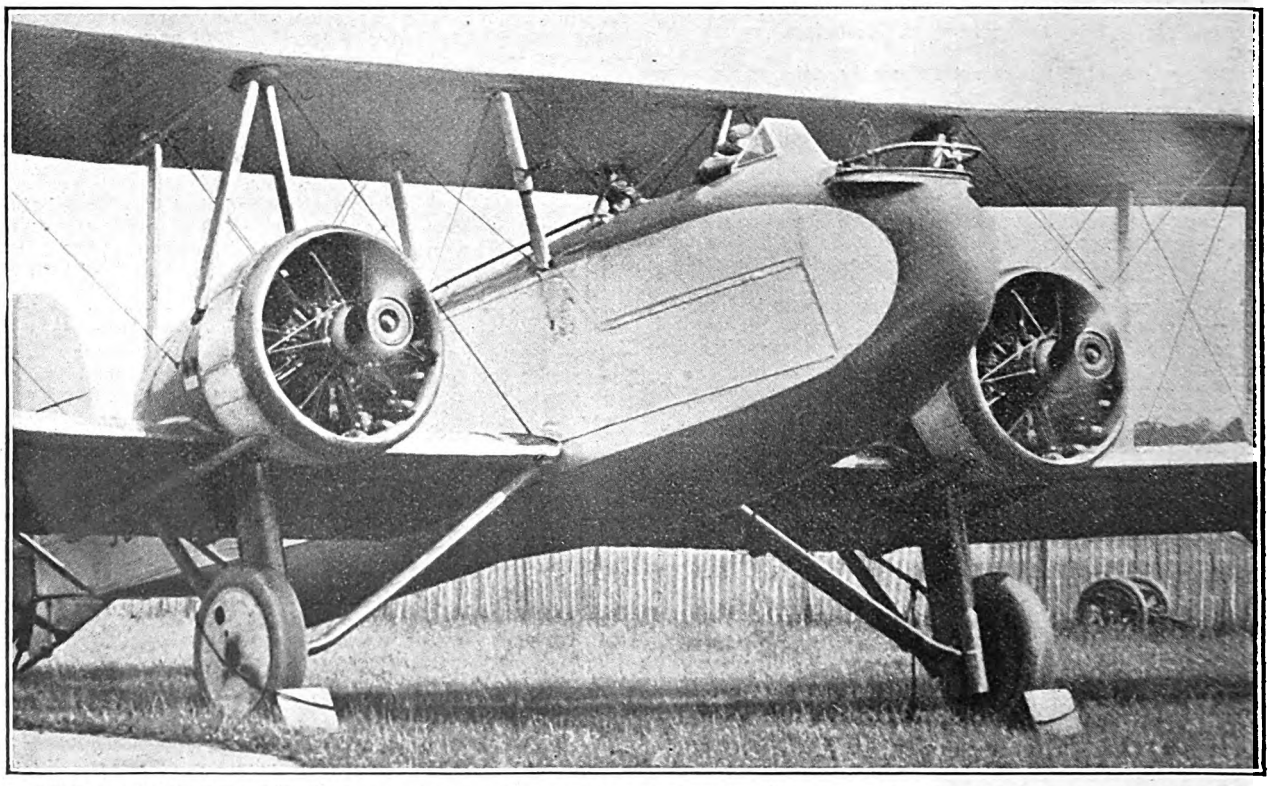
## THE LATEST VERSION OF THE SIDESTRAND.

At the R.A.F. Display at Hendon last year the struggle between the Sidestrand and two of the single-seat fighters excited comment. The manœuvrability of the type in apparent contradiction to its size is so striking. In the Sidestrand Boulton and Paul Ltd. have developed a type which has won for itself a reputation as a twin-engined day bomber of really remarkable performance.

According to *All the World's Aircraft for* 1929 the Sidestrand for an all-up weight of 10,200 lbs. (4,636 kgs.) has a top speed of 140 m.p.h. (225 km.h.). This performance has been considerably improved by the installation of the Jupiter XF engines, but as this machine is still on the Part Publication List of the Air Ministry, details of the improved performance may not be published.

A Townend Ring has been developed by Boulton and Paul Ltd., who have the rights for this device, for the engines of the Sidestrand. These rings are of the thick section type and are placed in front of the engine. They also serve as exhaust collectors. Behind these rings, as may be seen from the photograph, is a kind of cowling which makes the whole arrangement look rather like the N.A.C.A. cowling as developed in America. These rings increase the speed of the Sidestrand by 10 m.p.h. at 12,000 ft.

From these considerations one can see that the Sidestrand III with Jupiter XF engines is one of the fastest machines of its type in Europe, and probably in the World. The makers have yet to hear that any standard service fighting aeroplane can overhaul this machine at its normal operating height. One or two of the latest types of fighter have a slight advantage at this height but they are not in general use, and the difference is so slight that, unless the fighter, when it had climbed to the level of the bomber, found itself almost within shooting distance, it would probably take hours to get within range,—by which time the bomber might well be home and the fighter over hostile territory.



THE LATEST SIDESTRAND.—Boulton and Paul Ltd. of Norwich have recently produced a new version of their well-known Sidestrand, with Jupiter engines inside Townend Rings (of which B. and P. Ltd. hold the patent). The unusually neat appearance of these will be noted.

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## THE NEW GEARED AND SUPERCHARGED BRISTOL JUPITER ENGINES.

Until recently engines for aircraft could be conveniently grouped into two main classes, one developing maximum power at sea level only and suitable for commercial aircraft, and the other developing or maintaining maximum power at altitudes greater than sea level and suitable for service machines. During the last few years the developments in the latter class, and particularly in the superchargers now almost universal on these engines, have resulted in the performance gap between the two classes being widened to such an extent that the introduction of an intermediate class of engine for use in aircraft where a good output is required, both at sea level and at altitudes up to approximately 10,000 feet, was desirable.

Amongst aircraft in this category are the General Purposes class of service machines and seaplanes, and certain commercial machines and air liners operating over routes which involve the crossing of mountainous districts and the taking off, with full load, from aerodromes in these districts.

It is to fill this requirement that the Bristol Company have introduced the Bristol Jupiter Series X.F.AM. and X.F.BM. engines, which, apart from the ratios of the airscrew reduction gear, are similar. The new engines are basically similar to the Bristol Jupiter X.F., a high-performance service engine, with the important exception that the supercharger is of the moderate speed type. The impellor runs at only 70% of the speed of the Jupiter X.F. impellor, and permits full-throttle operation at approximately 5,000 feet.

The performance of this engine, compared with the equivalent normally-aspirated engine, justifies the selection of this type by Imperial Airways Ltd. for their new four-engined flying-boats, which are to be used on the new Empire Air Route between London and Capetown, and also for the large new landplanes which are to be used on the route to India. In both cases high performance at full loads at high altitudes with one engine out of action is essential, and could not be attained with naturally-aspirated engines without considerable reduction of the paying load.

That these engines mark a big step forward for commercial aviation is evident by the comparative performance. That they possess the high standard of built-in reliability characteristic of the Jupiter has been demonstrated by the successful completion of a rigorous Type Test made for Imperial Airways Ltd. which included, among other unusually searching investigations, 50 hours' running at maximum power and maximum permissible R.P.M. The fact that the Bristol company readily undertook to subject the engine to this test is an indication of their confidence in their latest product.

That economy of operation has not been sacrificed is shown by the fact that on test, under cruising the conditions laid down by Imperial Airways Ltd., the fuel consumption was under 23 gallons per hour, and the oil consumption under 5 pints per hour.

The test was completed in five 10-hour non-stop runs at an average sustained power of 570 B.H.P. at 2,200 R.P.M., and for the high power test at the completion of the test the engine developed 622 B.H.P. at 2,200 R.P.M.

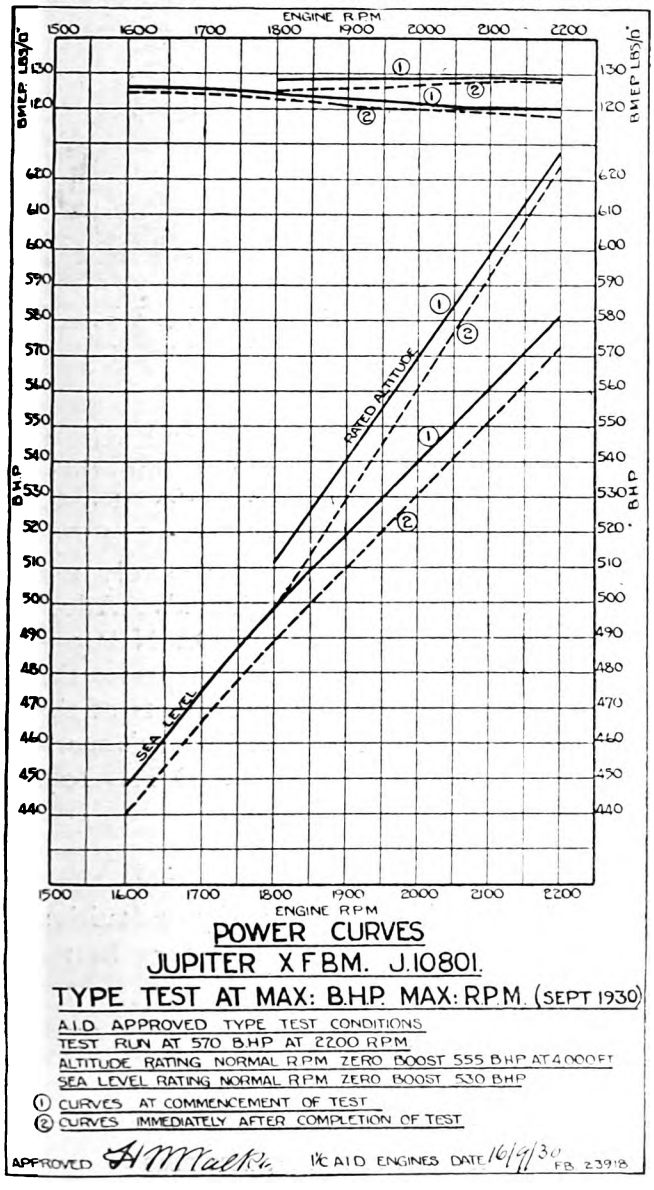
### LEADING PARTICULARS.

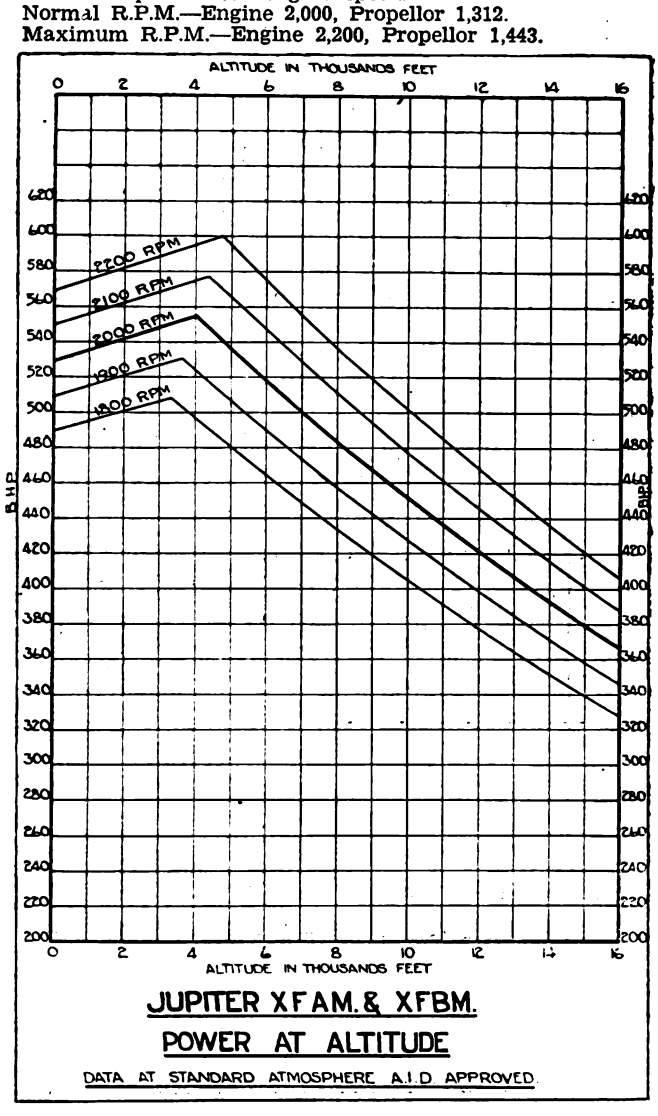
#### THE JUPITER SERIES X.F.BM.

Type—9-cylinder air-cooled radial, with medium ratio supercharger and airscrew reduction gear.
Bore and stroke—$5\frac{3}{4}'' \times 7\frac{1}{2}''$.
Total swept volume—1,753 cu. ins. (28.7 litres).
Airscrew speed—0.5 engine speed.
Normal R.P.M.—Engine 2,000, Airscrew 1,000.
Maximum R.P.M.—Engine 2,200, Airscrew 1,100.
Rating at normal R.P.M.—555 B.H.P. at 4,000 feet.
Power at maximum R.P.M.—600 B.H.P. at 5,000 feet.
Carburettor—Bristol Triplex.
Ignition—Dual 2 H.T. magnetos.
Ignition control—Automatic variable.
Fuel—D.T.D. 134.
Oil—D.T.D. (mineral) 109.

#### THE JUPITER SERIES X.F.AM.

Airscrew speed—0.656 engine speed.
Normal R.P.M.—Engine 2,000, Propellor 1,312.
Maximum R.P.M.—Engine 2,200, Propellor 1,443.

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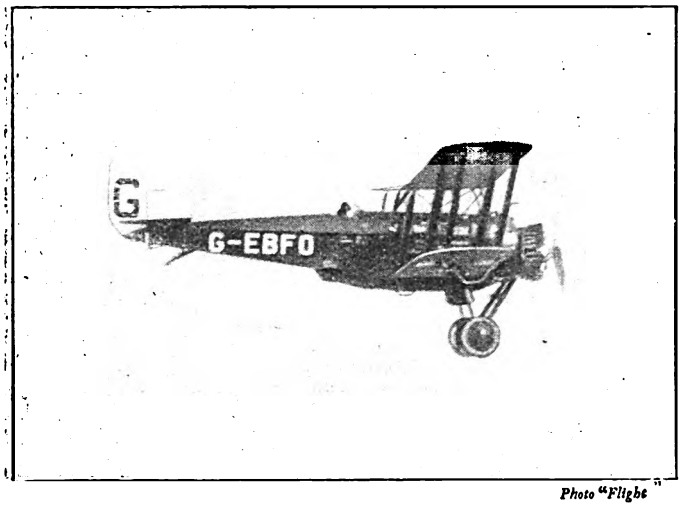
A series of air achievements in which K.L.G. Plugs played their part

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Capt. E. A. Jones.

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# TRADE NEWS

### OPPORTUNITIES IN CANADA.

An established aeronautical company in Canada with good connections throughout the Dominion, is anxious to get in touch with English manufacturers of aircraft material, parts, accessories, supplies, etc., with a view to establishing representation and sales agency of their products in the Dominion.

If those firms interested in the marketing of their products in Canada, will communicate with the Editor of THE AEROPLANE, marking their letters "Canada," they will be put in touch with the Canadian firm concerned.

### ABOUT PORTUGAL.

When THE AEROPLANE of Oct. 1 was published, with an excellent photograph of a Blackburn Iris Flying-boat moored off the famous Tower of Belem, near Lisbon, on the cover, we unfortunately omitted to say that the photograph was received from Colonel Velha da Palma, a Portuguese officer who served with distinction during the War 1914-18 in command of a battalion of Portuguese Infantry in the trenches opposite Lille.

Colonel Velha da Palma, whose address is, Sitep, Rossio 93.-3°, Lisbon, Portugal, is now interested in developing tourist traffic in Portugal, and would be very glad to hear from any reader of THE AEROPLANE who is thinking of spending a holiday in that delightful country. He will be equally pleased to attend to their needs, whether they are coming by boat, by rail, by car, or by air.

### MISS ETHYL'S ADDRESS.

Owing to a typographical error the address of the Ethyl Gasolene Corporation was wrongly stated last week. This should be Abford House, Wilton Road, Victoria, S.W.1.

### THE BORDER COUNTRY.

A reader in Carlisle writes:—

I am a confirmed reader of THE AEROPLANE and apart from its technical excellence find its philosophy and literary style a refreshing change from other journalism,—even when most controversial.

### THE AERO GOLFING SOCIETY.

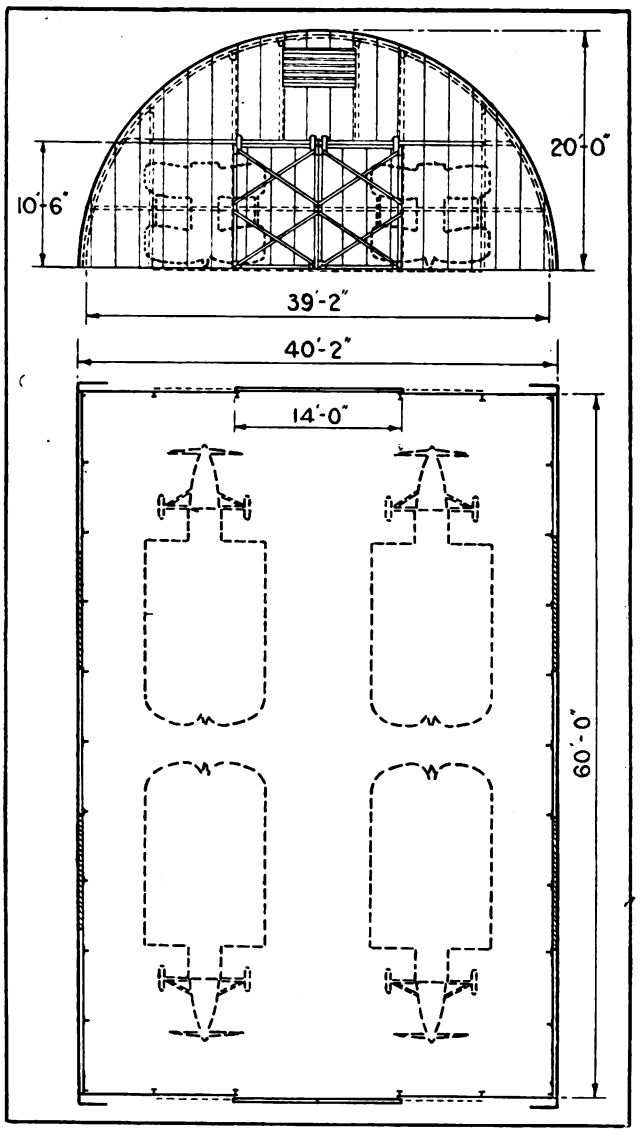
The Autumn Meeting of the society was held at Sunningdale on Oct. 21. The "Cellon" Challenge Cup was won by O. D. Freeman, 88 less 15 = 73. In the Four-ball Foursomes Commander Wilfred Briggs, R.N. (retd.), and Sq. Ldr. C. J. W. Darwin, R.A.F.O., returned 7 up.

### THOROUGHNESS AT BROOKLANDS.

The Brooklands School of Flying has long been known as an example of thoroughness, and that fact alone is a proof of the advertising value of a reputation. On a recent visit to Brooklands we saw the workings of the instruction system already described in THE AEROPLANE, the blackboard on which each item of necessary knowledge was marked off for each pupil as and when covered, and the report form which each pupil hands to his instructor at the start of the lesson. With the number of students dealt with by the school some such system is needed to ensure that no gaps are left in the practical training of any.

Because they realise the bearing which physical fitness has on a pilot's safety and skill, the directors of the School have also planned a gymnasium and squash court in one of the hangars. Considerable improvement in the Brooklands Aerodrome is looked for at an early date and arrangements are already being made. The elimination of the historic sewage farm will extort reminiscent sighs from some of the old-timers, but hardly from any who still fly from its vicinity, and the splendid possibilities of Brooklands as a first-class aerodrome may shortly be realised.

Mr. Lowdell, who is an instructor at the Brooklands School of Flying and whose sterling performances on the Blackburn Lincock two years ago will be well remembered, is rumoured to be making further use of his skill with this smart little machine.




A Nissen hangar with accommodation for four Gipsy-Moths.

### SHEDS FOR MOTHS.

As the result of a half-page advertisement taken in a special Airport Issue of THE AEROPLANE some time ago by Nissen Buildings Ltd., of Rye House, Hoddesdon, Herts, this company received several inquiries from abroad, notably South Africa and the Malay States, for aircraft sheds constructed on the patented Nissen system, so well known to all troops in the War 1914-18.

As the result of these inquiries the Nissen Company designed a special shed for housing four Moths in a folded condition. This shed is shown in the attached drawing. Its price is £255 f.o.b. London, and it is just what is wanted by users of light aeroplanes overseas.

The Nissen construction is easy to erect, dismantle, and re-erect, and for overseas use these features are distinctly useful. Full particulars of this shed and other types of buildings specially designed to suit all climates will be gladly given by Nissen Buildings Ltd., Rye House, Hoddesdon, Herts.

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### "DEAF TO MIRTH AND BLIND TO SCORN."

According to the latest American sound-film, London was defended during the War 1914-18 from air attack by Americans. The two heroes of *Hell's Angels* are Americans, who are supposed to have succumbed to the appeals of a strange kind of female recruiting-officer to enlist in the Royal Flying Corps. They immediately become pilots and take part in the destruction of a Zeppelin which is engaged on a raid on London. Now, for the benefit of those innocent people who believe what they see on the films, American subjects did not take any part of the defence of this country from enemy air raids, nor did the Royal Flying Corps ever have to appeal for recruits by orthodox or unorthodox methods. Competition to join the R.F.C. in any capacity whatever was so keen that the Corps was able to select its personnel by a process of elimination.

Germany will find it even more difficult to swallow the member of the crew of a Zeppelin who, because of his English friends, arranges for a large and expensive load of bombs to be dropped harmlessly into the Serpentine (or was it the Welsh Harp?) during an air raid.

But even stranger than their habit of reconstructing the histories of older and wiser nations is the idea prevalent among America authors and film producers, that the youth of these older nations went, in 1914, unwillingly to War.

Apart from these examples of the curious working of the film producer's mind, *Hell's Angels* is a wonderful effort. The views of the Zeppelin (probably the Los Angeles) travelling through clouds, taken from the air, are magnificent, and the scenes taken from various points inside the airship are remarkably interesting. The picture of it descending in flames is perhaps unduly prolonged and might be cut, in this country anyhow,—especially in the light of recent events.

The inevitable blonde is in the film, but neither her tropical kit nor her tropical temperament are allowed to make a lasting impression on the heroes, and she does not appear in France in the second part of the picture.

The scenes of air fighting in France are marvellous. There are over fifty machines in the air at one time and the reproduction of a "dog fight" makes it easy to believe those who claim that five lives were lost in making the film. Many of the aeroplanes are replicas of war-time machines, and one of the German Squadrons consists entirely of Fokker D.VII's.

The photography throughout this film is remarkably good, and only the critical would notice that however many engines are shown running on the film, the noise of one engine is recorded—C. M. MCA.

### MANY INVENTIONS.

"Pantagruelism," as erudite AEROPLANE readers all know, is a certain jollity of mind, "pickled in the scorn of Fortune," which is exactly what Commercial Aviation needs at the moment, for with a certain jollity of mind you must necessarily have an unbounded optimism. Without it at a time when Fortune has dealt Civil Aviation a series of shrewd buffets you may become a puling pessimist and write gloomy letters to *The Times* from the depressing atmosphere of some West End club to show that everything is wrong with Civil Flying. You may sign your letters Lieut.-Commr., R.N., Ret., or Lieut.-Gen., A.S.C., ditto, but they will be the overflowings nevertheless of an ill-modulated liver and will prove you to be admirably adapted for modern heavy-weight boxing in that, instead of coming up smiling and the more determined after a hearty spot of punishment, you lie down flat and call for your bath sponge and flowered silk dressing gown. It would not be nice to be like that and therefore let us have a certain jollity of mind pickled in the scorn of fortune and reflect upon the stout work being done and the progress being made all over the world in Commercial Aviation rather than upon our quite temporary run of bad luck.

*The Sunday Express* really ought to get "Beachcomber" to write their aviation stuff. Then we should know it was consciously humorous. Last Sunday, for example, there were headlines almost half an inch high about "Why Vicar's Daughter Flew," under which appeared the remarkable aeronautical adventures of one "Maisie" who amongst other epithets, not meant unkindly we feel sure, was described as "a brave little girl" and "a case of hero worship." Maisie's thrilling experience, it seems, was to fly to Berlin as a passenger, sitting quietly in the cabin of the *Columbia* instead of doing ditto in the cabin of the regular daily service operated to and from Berlin by Luft Hansa, and it is a trifle difficult to know what that day's ordinary passengers to Berlin have done to be deprived of a column or so devoted to their personal charm and adventurous dispositions.

Next, in the same newspaper, came an article which we regret to say was by *The Sunday Express* Air Correspondent about "Roof to Roof Air Taxi Planes" which would hop from roof to roof in London like so many blinking sparrows and this was justly described as a revolutionary plan for London and a sensational project. This delightful scheme, whereby all one has to do presumably is to open a bedroom window and shout "Taxi," which, if the roof is a sloping one, would appear, and keep on hopping up and down on the tiles until one is ready to come aboard off the gutter instead of the curb, is designed to speed up communication between London and Croydon Aerodrome. It is to be done with Autogiros and is being seriously considered by those anonymous "London Aviation Experts" so lovingly quoted by the Press on such occasions.

No doubt these experts have seriously abandoned the scheme after measuring up the Autogiro of to-day in comparison with the average trunk carried by American air travellers. All this would have been delightful reading after a plethoric Sunday lunch, but the Air Correspondent unfortunately went on to speak authoritatively about the present (excellent) organisation of the Air Traffic Companies for conveying passengers from London. That he knew nothing about it and had not troubled to inquire was proved by his own words.—"To-day," he wrote, "passengers leave central London by car an hour before their airplane starts and *also have to make a slow road journey on arrival at Croydon.*" (Italics are ours.)

That is most unfair to the present system and he should have explained that the journey is a direct, non-stop run from central London to the Aerodrome which never exceeds 35 minutes and that generally considerably less than the rest of the hour is needed for essential formalities. As for the slow road journey on arrival at Croydon, this is mere fiction, the origin of which must ever remain as great a mystery to us as it doubtless is to the man who penned it. Surely a newspaper Air Correspondent is expected to know something about the simple elements of what he writes about.—Or isn't he in *modern* journalism?

That indefatigable Knight, Sir Alan Cobham, has interested himself in a People's Theatre for London similar to the Berlin one and offers any member of the scheme who gets a hundred or more to subscribe before Nov. 20 a free flight over London and Windsor or over Paris or Rotterdam.

If Sir Alan is doing a personally supervised tour the following historic extract from a guide book to the Netherlands dated 1430 or 1930, we are not sure which, as the second figure is erased, may interest him as useful patter. "On our starboard bow, ladies and gents, we have the famous dam which being bored by a death-watch beetle began to let the High Seas in until a small Dutch boy rammed his last wad of Wrigleys into the orifice on his way home to tea. Later owing to the mysterious action of centrifugal force the lump of gum blew out with a report like a bottle of near beer exploding in New York and the countryside became a waste of water. The Burgermaster, who at the moment was engaged in drifting sideways downstream on an upturned kitchen table in full canonicals including a formidable fur hat of office, solemnly expurgated the lad with a bell book and candle he happened to have with him referring to him as a dam rotter and so, after this youthful hero the inhabitants of these parts, having finally come up for the third time, named the now flourishing town of Rotterdam well known in our era for the K.L.M."

We are extremely pleased to hear that Mr. Paddy Flynn, the pilot of G-EBIX, which crashed near Boulogne last Thursday, is getting on as well as can be expected and is so much better that Mrs. Flynn was able to leave him and return to England. Flt. Lt. Wilson flew Mrs. Flynn across to Boulogne on Friday, and Mrs. Wilson went along as well to interpret for her and to help her in her trouble,—a very kind-hearted action, especially as one believes they were not previously acquainted.

Mr. F. H. Mason, who lost his life last Thursday when on

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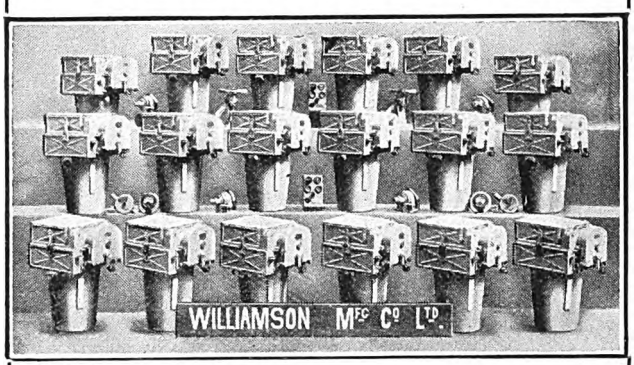


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duty as flight engineer on board G-EBIX, which crashed near Boulogne, will be sincerely mourned by all who knew him, for he was extremely popular with his colleagues, with Imperial Airways pilots and with all Civil Aviation people. Perhaps of the Imperial Airways pilots who knew and liked Mason Mr. Gordon Olley is the one who will miss him most deeply, for it was with Mr. Olley that he made his earliest flights in 1919 with Handley Page Transport Ltd. Since that time Mason has been engaged in Commercial Aviation almost without pause, and when the special charter department of Imperial Airways was started in 1928 under Mr. Olley's management he was his sole mechanic and obtained the highest praise for the work he then did.

So keen was Mason on aviation that he learned to fly with Col. Henderson at his own expense, and but for being afterwards turned down on medical grounds he would most probably have been an Imperial pilot to-day. The older Imperial pilots, than whom better judges cannot be found, say he was a remarkably fine pilot.

Mason was one of those hard-working, skilful and conscientious engineers who have done so much more to build up Civil Aviation than they are ever given credit for. And knowing how the late Air Vice-Marshal Sir Sefton Brancker and Sq. Ldr. Johnson must have valued such a man, we cannot refrain from quoting the following few lines from Kipling, whose verses so often contain fine epitaphs for the finest types of men:—

He scarce had need to doff his pride or slough the dross of Earth,
E'en as he trod that day to God so walked he from his birth,
In simpleness and gentleness and honour and clean mirth.

So cup to lip in fellowship they gave him welcome high,
And made him place at the banquet board—the Strong Men ranged thereby,
Who had done his work and held his peace and had no fear to die.

The poem, it will be remembered, describes a Heaven where real men rest from their labours after doing good work on earth.—SPRY.

### IN THE CITY.

BY G. P. KERR.

[*These notes appear once in every Stock Exchange Account and are intended to be of interest to those who hold or intend to hold investments in companies concerned directly or indirectly with aviation.*]

Contango days—Nov. 3, Nov. 17.
Account days—Nov. 6, Nov. 20.

The outstanding feature of the past account has been the continued rise in the price of gilt-edged, and the persistent demand for investments where the security is indisputable. The yield at present levels on British Government Stocks averages little over 4¼% and investors are now prepared to buy the best Debentures at prices which give a return of only a few shillings more per cent. The recently issued Gas Light and Coke Debentures, for instance, at £2 premium yield only 4¾%.

Among aviation securities the chief activity has centred round the Ordinary shares and Debentures of Fairey Aviation Company Ltd. The 10s. shares started the fortnight a dullish market at around 11s. and strengthened 1½d. or 3d. per day till at one time they were 12s. 6d. middle. Subsequently a reaction took place and they closed the account at 11s. 6d

The rise was attributed to the news that the Company had obtained substantial orders from the Belgian and the Greek Governments. The order from the Greek Government is said to have given special satisfaction to the Chairman and Managing Director. Another well-known figure in British aviation remarked, "Fairey can now advertise that he has supplied military aircraft to the Argentines and the Portuguese *and* the Greeks!"

For the year ending Sept. 30, 1929, Fairey Aviation distributed 7% and unless a larger dividend is forthcoming for the past period, the Ordinary shares look very fully valued in comparison with the 8% 1st Mortgage Debentures—though of course they cannot properly be compared at all.

The Debentures, which are a first charge on the whole of the assets of the Company, are quoted at about £100, but they are not easy to get. In addition to a flat yield of 8 per cent. there is a capital profit of £5—if held until the final date of redemption in 1940, or drawn for repayment before that date. For such a good return they appear a remarkably well-secured holding. The original issue amounted to £300,000 and the share capital is £500,000. Interest on the full Debenture issue requires only £24,000. The last trading profits published amounted to £164,953, so that the Debenture interest is covered over six-and-a-half times.

One other point adds to the attractiveness of the stock.

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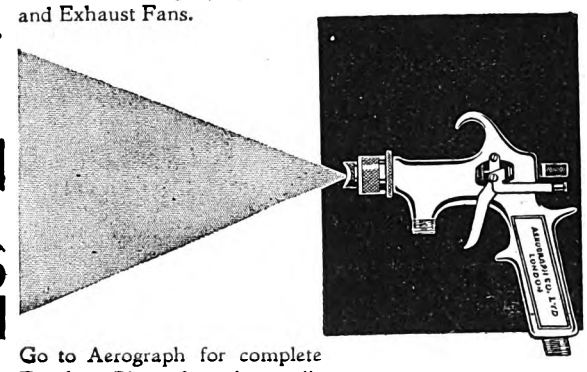


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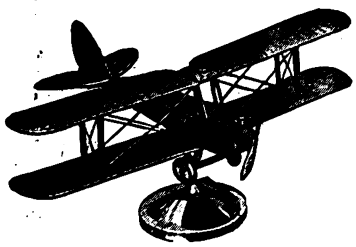

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A cumulative sinking fund of 7%, to be applied in the purchase of stock at or below £105, or by drawings at £105, began in July last, and it is known that the Company has taken the opportunity of purchasing in the market at figures well below the price of redemption. The security of the remaining Debentures is accordingly increased, and there is little doubt that they will stand at higher levels as more and more are drawn or purchased for redemption. Earlier this year these same Debentures could have been bought at 93.

Handley Page 10% participating Preference shares, which had weakened to 10s. 9d., are firmer at 11s. I mentioned last time a seller of some thousands of shares at around 10s. 9d. I am able to report that all these have now been taken.

There has also been a cessation of selling of De Havillands £1 shares, many of which are still held on the other side of the Atlantic, and the price recovered to 30s. 3d.

A small and steady business goes on in the £1 shares fully paid of Imperial Airways. On the sad news of the recent disaster at Neufchatel, the price was lowered to 18s. 6d. and closed the account at 18s. 9d. It is not often fully realised that the loss involved by a crash of this kind is by no means borne by the insurance companies exclusively.

Negotiations are still proceeding for the raising of further Debentures on National Flying Services. I hear there has been a buyer of the Ordinary shares at around 4½d.

Rolls-Royce have recovered to 40s. 7½d. Petters remain at 22s. Napiers are steady at 10s. 4½d. Napier Lions have been ordered by the Greek Government for their new Fairey III Fs, and the Japanese Government have placed a further order for Lions to be fitted to aircraft built in Japan. Two bull points—[or rather lion points.—ED.]—for the shares.

| | Making-up Price. Oct. 20 | Nov. 3 | | Making-up Price. Oct. 20 | Nov. 3 |
|---|---|---|---|---|---|
| De Havilland ... ... | 29/6 | 30/- | Nat Flg. Services Ord. 2/- | 3d. | 5d. |
| Handley Page 10% 8/- Pf. | 10/9 | 11/- | Do. do. Deb. | 40 | 40 |
| Fairey Aviation 10/- ... | 11/- | 11/6 | Petters ... ... ... | 22/6 | 22/- |
| Do. Deb. ... | 100 | 100½ | Rolls-Royce £1 ... ... | 40/- | 40/7½ |
| Imperi l Airways £1 fy. pd. ... ... ... | 19/- | 18/9 | S. Smith & Son, 1/- Dfd. Do. do. | 3/9 | 3/6 |
| D. Napier ... ... ... | 10/- | 10/4½ | £1 7% Pfd. Ord. | 30/9 | 30/- |

## PERSONAL NOTICES.

FORTHCOMING MARRIAGES.

COMBE—BAINBRIDGE.—The marriage arranged between Flt. Lt. Gerard Combe and Miss Brenda Mary Bainbridge will take place at St. Peter's Church, Bournemouth, on Nov. 12.

LUCAS—EDWARDS.—An engagement is announced between Mr. Philip Gadesden Lucas (R.A.F.), only son of Mr. and Mrs. Lucas, of Riverway, Eynsford, Kent, and Janet Ada Nina, only daughter of Major Osborne Edwards, V.D., J.P. (Divisional Engineer, Indian State Railways), and Mrs. Osborne Edwards, of Malabar Hill, Bombay, India.

MOLESWORTH—HOLMES.—The engagement is announced between Mr. Anthony Molesworth, R.A.F., only son of the Rev. and Mrs. A. O. Molesworth, The Vicarage, Lynton, and Miss Noëlle Holmes, youngest daughter of Mr. and Mrs. J. R. Holmes, of Holm-Lea, Newton Abbot.

VINTCENT—JOHNSON.—The engagement is announced between Nevill Vintcent, D.F.C., late R.N. and R.A.F., younger son of Mr. and Mrs. Charles Vintcent, of George, South Africa, and Pamela, elder daughter of Mr. J. R. Johnson, M.R.C.S., and of Mrs. Johnson, of Marshgate House, Richmond, Surrey.

[Mr. Vintcent will be remembered as a member of the first course at Cranwell, and as the first Cranwell Cadet to win a decoration on active service. He left the R.A.F. a few years ago to devote himself, with Mr. Newall, to commercial flying.—C. G. G.]

DEATHS.

CORSELLIS.—On Nov. 1, at Stag Lane Aerodrome, killed while flying, Douglas Henry Corsellis, Barrister-at-law, aged 34.

BERRY.—On Oct. 30, at Cranwell, the result of a flying accident, Flight Cadet Peter Berry, elder son of Horace and Maud Berry, of Ashbridge, Totnes, Devon.

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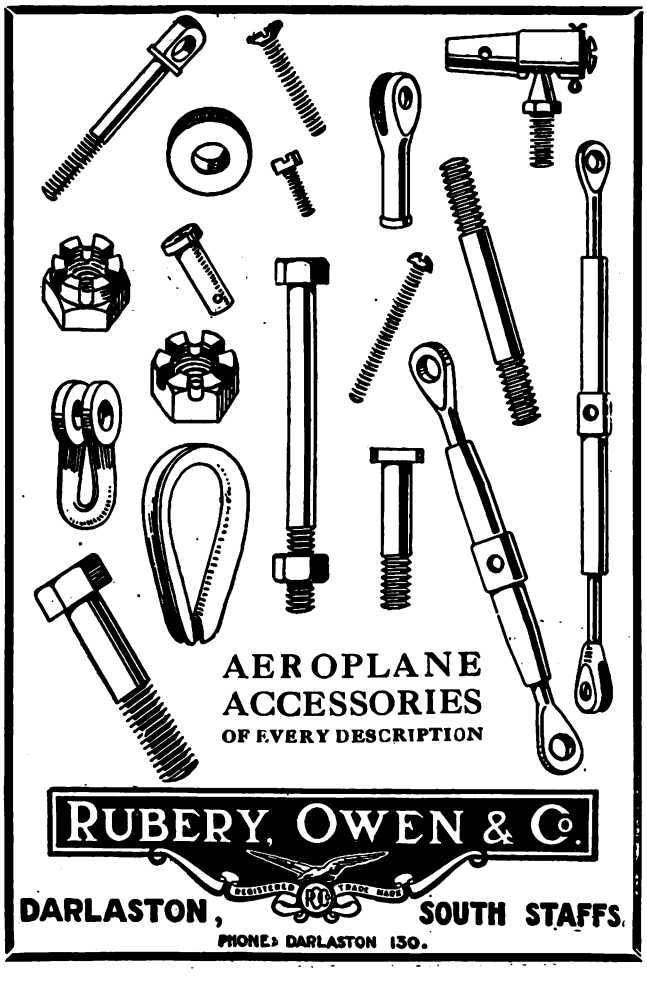


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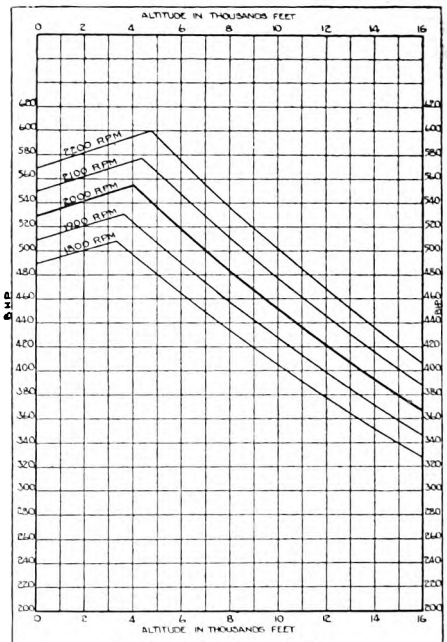
| ,, ,, propellor ... | 1,000 | 1,312 |
| Maximum R.P.M. engine ... | 2,200 | 2,200 |
| ,, ,, propellor | 1,100 | 1,443 |
| Rating at normal R.P.M. ... | 525 B.H.P. at 11,000 ft. | 525 B.H.P. at 11,000 ft. |
| Power at maximum R.P.M. | 575 B.H.P. at 13,000 ft. | 575 B.H.P. at 13,000 ft. |

| | X.F.A.M. | X.F.B.M. |
|---|---|---|
| Propellor speed ... ... | 0·656 engine speed | 0·5 engine speed |
| Normal R.P.M. engine ... | 2,000 | 2,000 |
| ,, ,, propellor ... | 1,312 | 1,000 |
| Maximum R.P.M. engine ... | 2,200 | 2,200 |
| ,, ,, propellor | 1,443 | 1,100 |
| Rating at normal R.P.M. ... | 555 B.H.P. at 4,000 ft. | 555 B.H.P. at 4,000 ft. |
| Power at maximum R.P.M. | 600 B.H.P. at 5,000 ft. | 600 B.H.P. at 5,000 ft. |




JUPITER XFAM. & XFBM.
POWER AT ALTITUDE
DATA AT STANDARD ATMOSPHERE A.I.D. APPROVED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# THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

THE
WESTLAND WESSEX
THREE ENGINED SIX SEATER CABIN MONOPLANE
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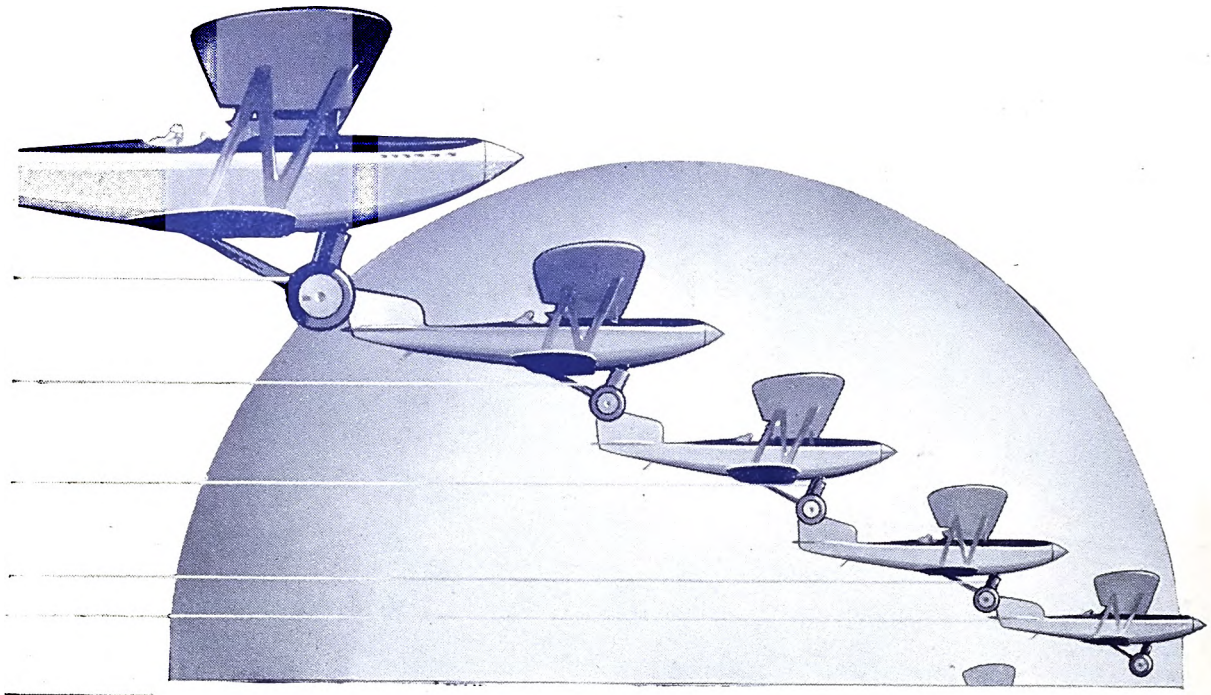

# "LEADING THE FIELD"

"No. 12 (Bomber) Squadron, R.A.F., . . . . . has mo[illegible] justified its motto of "Leads the Field" this yea[illegible] Squadron's aim has been to clean up everything for which they competed and the following list of achievements shows how they have succeeded."

"AIR PILOTAGE EXERCISE——First in order of merit."

"CAMERA OBSCURA EXERCISE——Best bombing average."

"WESSEX AREA ANNUAL ESSAY COMPETITION——Won by a member of the Squadron for the third year in succession."

"BROOKE-POPHAM STEEL SHOOTING CUP FOR THE BEST SQUADRON RIFLE TEAM——Won by No. 12 Squadron at Bisley, June, 1930."

"ARMAMENT OFFICERS' BOMBING TROPHY——First holders and the Squadron top of the Day Bombers for the third year in succession."

Extract. "The Aeroplane," October 15th, 1930:

No. 12 Squadron is equipped with Fairey "Fox" High Performance Day-Bomber aircraft.

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Service Aircraft

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their existing regulations entirely. Thus, naturally, it will not be taken up till quite a number of people have been killed,—either in collisions in the air or in collisions in taking off or landing.

We have had several fatal accidents already in civil flying owing to that cause. There was the case of a distinguished officer in the Royal Air Force flying a civil aeroplane from a Service aerodrome. He took off straight ahead and hit a roller which was working on the aerodrome, simply because the position of his engine prevented him from seeing ahead as he was taking off. Such an accident as that ought to be absolutely impossible.

We have had one of our most competent instructors and his pupil killed through a private owner blundering into him while each was in the "blind spot" of the other. And no such thing as blind spots forward ought to be allowed.

The probability is that the late and ever-to-be-lamented Doctor Whitehead Reid was killed when trying to land in a very bad light because as he raised the nose of his machine to come slowly into a field the engine obscured his view of the tree which he hit.

When we have killed enough people through accidents of this sort the Air Ministry will arise and insist on having 100% visibility all over the hemisphere in front of the pilot. And when we arrive at that stage we shall go still further ahead in getting the World's trade in aeroplanes, for we shall be that much better than our foreign competitors.

### Supply and Demand.

There is just a possibility that public demand or, on the other hand, the refusal of the public to buy aeroplanes which have not an adequate view forward, will operate before the Air Ministry takes action.

The Chairman of our leading firm of manufacturers of civil aircraft, Mr. Alan Butler, of the De Havilland Aircraft Co. Ltd., has said publicly that the firm's new monoplane, with an inverted engine, has given him an entirely new outlook on flying. So we may take it that the said firm intends that all its new types shall have to have first-class visibility. But, naturally, in the meantime people who cannot afford the latest type of aeroplane will buy second-hand aeroplanes of the older types in which the view is obscured. And so long as the older types still exist we shall have collisions in the air, and collisions with things upon the ground. Therefore we can only hope that all aeroplanes in which the forward, upward and downward view is bad may be broken up out of existence before too many people are killed,—for that will be the best possible help to new business. And there will be a great deal of interest in seeing whether the Law of Supply and Demand comes into operation and abolishes aircraft in which the view is bad before the Air Ministry steps in and makes good visibility compulsory.

### The Service Side.

Obviously, before the Air Ministry can bring in any such regulations for Civil Aviation, the Service side of the Air Ministry must introduce similar regulations, or rather requirements, for their fighting machines.

Some day the Air Staff will awake suddenly to the fact that a fighting pilot who has roughly 75% view within the complete sphere of which his head is the centre will have an immense advantage in a fight over a pilot whose view in the forward hemisphere is about 10%, even though his view backwards may be very much larger. The backward view is of no particular value to him unless he is flying a slow aeroplane which is asking to be attacked,—and then he probably has a gunner to protect his tail.

There is an idea among the pilots of fighting machines that so long as you can see through your gun-sight the machine which you are chasing you have got all that is needed of what our American friends call a "pursuit ship," or what we call an "intercepter fighter." That is true enough when once you have sighted the enemy aircraft. But it is very little use if you are climbing after an enemy machine which may very well be above you in such a position that it is completely hidden by your upper wings or even by your engine.

Actually, in the Royal Air Force practically the only pilots who have a first-class view of where they are going are the pilots of the slowest machines in the Service, namely, the big twin-engined bombers and the troop-carriers. And, taking it all round, the faster the aeroplane the less view of the sky in front of him the pilot actually has.

Yet there is no particular difficulty in visualising a machine as fast as anything which we possess to-day in which the pilot and a gun stick out in front of everything else with an engine on each side. The Segrave Meteor, for example, has in it the makings of an extremely good high-speed fighter, just as it also has in it the embryo idea of almost the ideal passenger-carrying aeroplane.

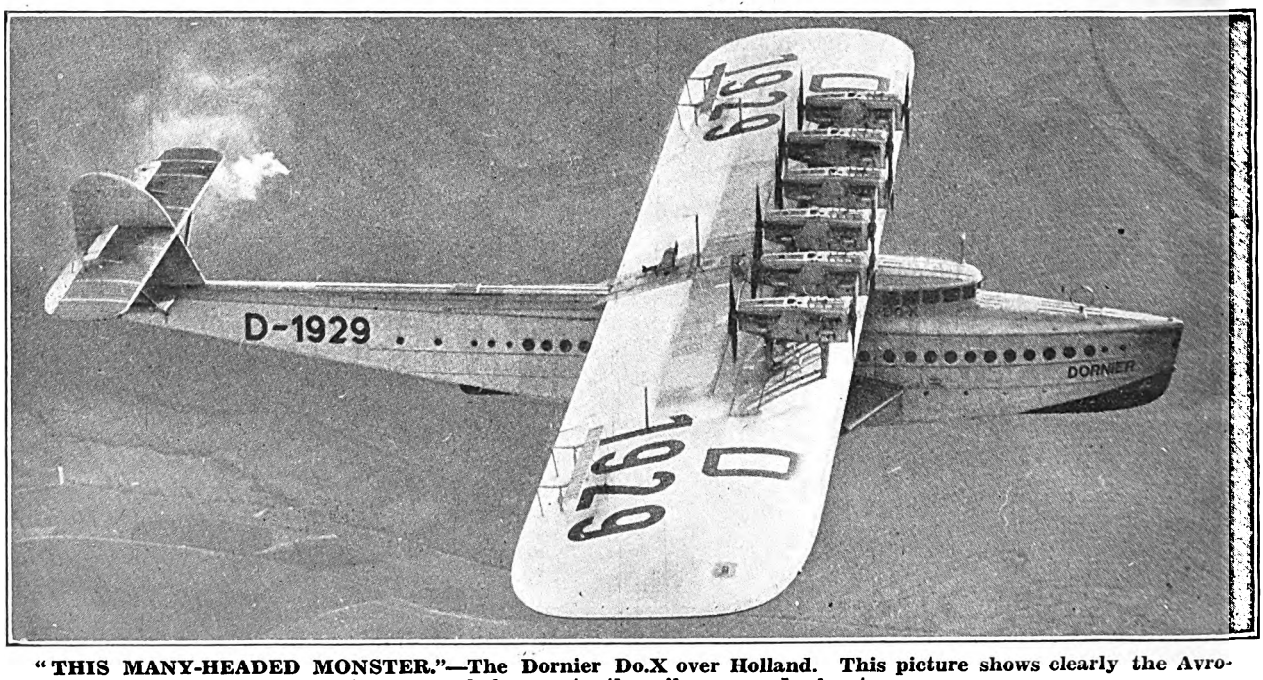
### The Personal Element.

In the meantime, in spite of the fact that aeroplanes which make the pilot more than half blind are allowed to pervade the sky as wholly airworthy, quite a number of excellent pilots are kept out of the sky because the medical authorities of the Air Ministry have their own ideas about what constitutes human airworthiness.

When the original medical regulations for Civil Aviation were invented somebody thoughtfully put in the clause that the new regulations about eyesight, or what we might perhaps call eye-worthiness, should not apply to anybody who had flown before a certain date. I forget at this moment what that particular date was, but it was virtually just about the end of our more serious war. That is to say, it was after the Armistice with Germany, and it was somewhere about the end of the time when we were fighting the Bolsheviks in North and South Russia, but before we began our minor wars in 'Iraq, India, and Aden, which have been going on and off ever since.

The idea behind the regulation naturally was, as in most of our public actions in this country, purely sloppily sentimental. It was in fact decreed so that if somebody had lost an eye in the war, or had patriotically gone into the war with only one eye and become a first-class pilot, as some people did, or had suffered from birth or from youth from defective eyesight and had learned to fly in spite of it with properly-focussed glasses, nobody should be able to say that the Civil Aviation Regulations were preventing one of the heroic defenders of his country from earning a livelihood as an aeroplane pilot.

You can quite see what a row might be raised over a Question in the House if somebody got up and said,—"My heroic friend Captain Jones was good enough to fly and die




**"THIS MANY-HEADED MONSTER."—The Dornier Do.X over Holland. This picture shows clearly the Avro-type servo-balances to the ailerons and elevators.**

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for his country in spite of his defective eyesight. But in these days of peace he is not considered good enough to carry passengers for hire or reward. The reward for his heroism is a little bit of ribbon and a little bit of metal called a decoration and a contemptible gratuity without a pension. And now he is not allowed to earn a living at the only trade which he understands."

Of course, that was all sheer guff. Possibly Captain Jones might have been a rotten bad pilot who somehow or another scraped through the war with his life, even to the regret of his colleagues whose lives he endangered in the air. Quite possibly he was never allowed to carry a passenger, and acquired the knack of crashing without killing himself, —which quite a lot of people did.

Probably he would be a most improper person to be placed in charge of an aeroplane with even one passenger, let alone of what the newspapers call "a giant air liner" with fifteen or twenty passengers. But just because he did fly during the war with one eye or with defective eyesight, and was therefore one of the heroes who still managed to live in the country which Mr. Lloyd George left us when he went out of office, he must be allowed to risk other people's lives as well as his own as a pilot of civil aircraft.

### The Other Side.

But, mark you, if a pilot's certificate to carry passengers for hire or reward were given to a man who learned to fly *after* that fixed date and had defective eyesight but in spite of it proved himself to be not only a first-class pilot so far as all tests could show but a very wise and cautious and safe pilot: and if that pilot had some kind of a fatal accident which was not in the least due to defective eyesight but was caused by something quite outside of his own control: then some political opponent of the Government might get up in the House of Commons and say that however much he regretted the death of the late Mr. Jones there was no doubt that the Air Ministry had been gravely careless of its duties to the British public which had elected it to power in that it had given a licence to fly for hire or reward to the late lamented Mr. Jones, who was known to have only one eye.

The political opponent might go on to say that poor Mr. Jones had only one eye from birth, and everybody ought to know that a man with one eye is not a safe person to trust even with a wheelborrow in the street let alone with one of these rapid transport vehicles of the air, and therefore, the Government deserved censure for allowing Mr. Jones to have a certificate as an aviator, and no doubt Mr. Jones would not have been given that certificate but for the fact that it was known that his father and the vicar of his parish were ardent supporters of the Government Party.

Now you see no Government dare face an attack of that sort in the House of Commons, and so the regulation was laid down that anybody who learned to fly with one eye *after* the statutory date fixed by the regulations must on no account be allowed to carry passengers for hire or reward.

### An Example.

I do happen to know of one instance in which a young man with only one eye, who was not a war pilot because he was too young at the date of the Armistice, did manage to learn to fly before the date specified in the regulations. He is undoubtedly not only one of the cleverest but one of the safest pilots in this country, for he has been flying for more than ten years without writing off an aeroplane, or hurting himself or a passenger. Yet he is not allowed to have what we call a Class B licence, or what the Americans call a Transport Licence to carry passengers for hire or reward.

He did manage to get an A licence, which entitles him to go and break his own neck, or to take up friends and break their necks too, if they like to take the risk and do not pay him for it. And such are the conditions that he has spent quite a fair amount of his time teaching paid pilots just out of the Royal Air Force how to land civil aeroplanes properly, so that they, who get their Class B licences without question on the strength of their experience in the Royal Air Force, may be really safe when they are put to do civil flying.

You see, the Air Ministry regulations assume that anybody who has done so much flying on war machines is *ipso facto* fit to carry passengers for hire or reward. As a matter of fact quite a number of short service pilots who have come out of the Royal Air Force and have flown hundreds of hours in big and little aeroplanes have about as much idea how to fly a civil aeroplane as I have myself,—which is precisely none at all. I only profess to know whether an aeroplane is being flown properly.

Consequently, before an Air Force pilot of the ordinary class is fit to fly, let us say, a joy-ride Avro, into and out of a football ground, he really needs a good deal of practice, and particularly he needs to be taught the precise tricks of the trade, because in all his Air Force experience, he has never had to take an old and loggy machine with a rotary engine and two or three passengers out of such a ground or to put it into it. And that is where my one-eyed friend comes in useful.

Apart from that he can fly anything that anybody likes to put him in, and some years ago, he made a speciality of flying one particular type of aeroplane which everybody else said was terribly dangerous.

Incidentally, I asked him what his particular trick was with that machine which made it safe for him to fly, although quite a number of extremely good pilots said that if the machine once got into a spin it could not possibly be got out of it. His reply, in the most innocent manner possible, was, "Oh, directly the thing begins to spin, I just turn the thing straight over onto its back." I wonder how many of even the first-class pilots in the Air Force who have to battle with strange aeroplanes in the course of test-flying would regard turning a machine upside down as being quite the natural normal and simple method of stopping a spin. And yet the man who is so completely at home in the air as to think that way, is not allowed to have a B licence,—for fear of Questions in the House if ever he did happen to have an accident.

### The Latest Restriction.

Now I hear that the medical people of the Air Ministry are going from bad to worse. They are refusing even A licences to people who have what they choose to consider defective eyesight. I came across recently one applicant for an A licence who is recognised as being by a long way the best pilot of either the pupils or the qualified A pilots at that school, who has been refused an A licence because of having only one eye. That particular pilot has never had but one eye since infancy, and would not now know what to do with the other eye if it existed. So what is the Air Ministry going to do about a case of that sort?

Another instance concerns a pilot who has flown over most of two continents, who is quite a competent test pilot of light aeroplanes, and who knows very much more about what an aeroplane can or cannot do or what a pilot has to do or has not to do in an aeroplane than many of the medical people anyhow. And yet he is debarred from having a B licence because he happens to be slightly colour-blind. He was actually told when applying for a B licence that but for the fact that he had already got an A licence somehow he would not in these days be passed for an A licence.

Actually he happens to have quite a keen colour-sense, and there is no doubt about his ability to distinguish between a white and a red and a green light under any ordinary circumstances. But, according to some of those mysterious Air Ministry tests, which involve those curious little Japanese books in which pictures look different according to whether you look at them through certain colour-screens or not, or whether your own eyes are sensitive to certain colours or not, his eyes cannot be trusted for night-flying.

Now, apart from the fact that he does not want to do any night-flying, and has been able to distinguish signal-lights quite well when he has been night-flying, and does not really want to be a professional aviator, but merely wants to have a B licence for the fun of having it, and possibly being paid by somebody some day or another to pilot a private aeroplane on a tour of the Continent, my young friend's colour sense is quite good enough for practical purposes.

Probably a professional commercial aviator with perfect colour sight might quite easily be misled on a wet or misty night about the colour of an aerodrome signal, but only picked pilots on regular night-flying duty ought ever to be in such positions as to need to land a load of paying passengers on a wet or misty night by aerodrome signals.

### A National Need.

Evidently what we need very badly in this country, among many other things, is a second class of commercial licence. That is to say, we want a First-Class licence for the type of man who would be employed, let us say, by Imperial Airways or some intelligent competing line, such as we hope to have some day for the good of trade,—the type of man who can be trusted with a load of passengers consisting entirely of crowned heads, to fly them across country at night and land them blind by a radio beacon. After that, we might very well have a Second Class licence for a man who is known to be a thoroughly sound trustworthy, wise and careful commercial pilot, but who because of some curious defect of vision, does not happen to be able to distinguish the peculiar niceties of colours through a wet windscreen or wet goggles. Such classes exist in other countries, and pilots from Overseas may fly here with them, though they could not get British licences.

There again the existing regulations are idiotic. So far as the medical people are concerned, a congenital idiot or a criminal lunatic with 100% eyesight and the necessary quick nervous reactions, which are supposed to make him capable of getting out of a tight corner, is a safer pilot than a man who is slightly colour-blind and rather slow in his movements but who has so much brain that he is never likely to let himself get into a tight corner.

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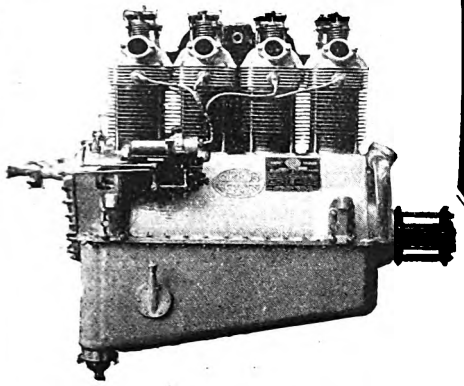

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| RDW4 | HERMES II | 2nd |
| RDW4 | HERMES II | 5th |
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## 1st CABIN PLANE FLIGHT TO AUSTRALIA

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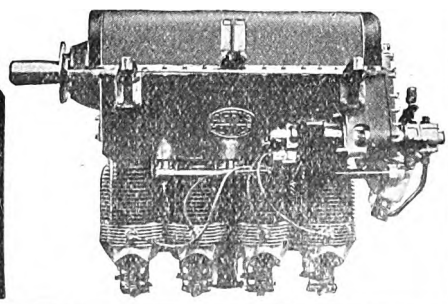

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Touching wood as I write, in spite of having one eye that is very nearly blind and astigmatism in the other eye and a defective leg, I have been driving fast cars for thirty-five years without once hitting anything. I do not say that I habitually drive at 80 miles an hour on the road, because I have never had a car that would do 80 m.p.h., but I have averaged 40 m.p.h. from London to Newcastle-on-Tyne, which is a matter of 270 miles. And yet plenty of my young friends who have very much better eyesight succeed in wrecking their cars without putting up as good an average.

Any hunting man would vastly rather have an aged and experienced and wise hunter who is a little lame on all four legs and happens to have a defective eye (I have had a horse like that) than a raw and wild young horse who has neither the brains nor the experience to get himself and his rider across country properly. Horses are exactly like men. There are horses which are born wise and there are horses which are born fools, and the wise defective horse is a better ride than a 100% healthy fool of a horse Exactly the same thing holds good with aviators.

The sooner the medical people and other authorities in the Air Ministry recognise these facts the better it will be for British Aviation. There are far too many reckless young fools who are allowed to hold their licences at the present moment. And quite a number of very sensible, very serious, very keen and incidentally very well-to-do people are refused licences just because they do not come up to a line of requirements laid down by a lot of medical people who are themselves just as lacking in real knowledge of what is most needed in aviation as are so many of our leading authorities on the scientific side of aircraft construction.

These are matters into which the Air Council might look, so far as it may be concerned with Civil Aviation. And it is distinctly one of the first matters to which our next Director of Civil Aviation, whoever he may be and whenever he may be appointed, should attend, for the good of his official career and his reputation as a person of human understanding.—C. G. G.

## A VERY SPECIAL ISSUE.

Readers are again reminded that the Paris Aero Show will open on Nov. 28. Consequently our gallant Allies of the French Aircraft Industry will get a great free advertisement all over the World out of the reports of their show in all the aeronautical publications of the World. So, as stated last week, to counteract this state of affairs, and to give British aeroplanes, motors, material, parts and accessories, even a greater advertisement than our rivals will get from the Paris Show, The Aeroplane will publish on Nov. 22 a Special British Aircraft Issue, confined entirely to British products, which will be in effect a Show Report of British aeroplanes and their components, as they would be if we had a show of our own.

Every firm concerned with the British Aircraft Industry has been asked to co-operate in this issue. And makers of British aeroplanes and engines have supported it handsomely. Therefore readers will find much interest in seeing the extent to which the auxiliary and ancillary trades, which have for the past few years been doing steadily increasing business through supplying material and parts to our aeroplane manufacturers, support the efforts of their best customers to make a first-class display all over the World against our foreign trade rivals.

The British Aircraft Industry is about the most wide-awake of British industries. Its exports are increasing at a far greater rate than are those of any other trade, our aeroplanes and engines are admitted to be the best in the World, and the prospects for next year are very bright. Consequently this Special British Aircraft Industry Issue comes at the right moment to increase the psychological momentum in our favour

It will be in the hands of all the Army, Navy, Air Service and Civil Aviation authorities (who are the people who ultimately influence the buying) of all nations, either before they go to the Paris Show or before they see the reports of the Paris Show. For their benefit all the reading matter will be printed in parallel columns of English and French,—for all the aeronautical people of all nations read one or other of those languages.

As this Special Issue is intended for World-wide circulation, and is outside the usual weekly issues of The Aeroplane, those regular readers of this paper who are not regular subscribers and want to make sure of getting copies are strongly advised to order them at once. The number printed will be large but it will not be unlimited.

The price will be one shilling per copy. And, considering that the issue will contain illustrations and descriptions of the aeroplanes, engines and accessories which each firm in the Aircraft Industry regards as its best products, the publication will be very well worth having.

## AN INTERNATIONAL SCANDAL.

Has not the time come for the representative organisations of International Aviation, such as the *Fédération Aéronautique Internationale,* and our own Royal Aeronautical Society, and the Royal Aero Club, and the Air League, and the Society of British Aircraft Constructors, and the Guild of Air Pilots and Navigators of the British Empire to announce publicly that the self-styled International League of Aviators represents nobody except Mr. Clifford Harmon, late of the U.S.A., and his hangers-on?

When this fatuous concern takes upon itself to judge what is and what is not the best performance in any given country it is not merely presumptuous, it brings ridicule upon undeserving people who do not understand the facts, and allow themselves to be dragged in as patrons of its public antics. Also it gives undeserved publicity to people who have no claim to notice.

Its latest effort (copied from *The Daily Express* of Nov. 11) is this:—

Paris Honours Atlantic Airmen.

Captain J. Erroll Boyd and Lieut. Harry P. Connor, pilot and navigator of *Miss Columbia* in the record Trans-Atlantic flight, yesterday received in Paris the trophy of the International Aviator League for the year's best performance by Canadian airmen.

The impudence and the fatuousness and the futility of the whole thing is shown by the fact that this was not a *record* flight of any kind (except in the foolishnesses mentioned in The Aeroplane on Oct. 15), and it was not a performance by *Canadian* airmen, because Connor is an American, and as a meritorious performance it does not compare with dozens of the performances of hard-working Canadian pilots on forest patrols, Arctic mail flying, and other work which has been of high value to the progress of Aviation in Canada.

The trans-Atlantic flight by Boyd and Connor has not been of the slightest value to progress. The machine and the engine had done the trip before. And there is no merit in taking an unjustifiable risk when failure would have definitely impeded the process of making the World air-minded.—C. G. G.

## THE IMPERIAL CONFERENCE.

The Report of the Committee of Civil Aviation was adopted by the Heads of Delegations to the Imperial Conference on Nov. 4.

The Report states that the Committee has reviewed the progress made in the development of Imperial Air Communications with heavier-than-air machines since the last Conference and that it has been impressed with the great advantages, political and commercial, which are to be derived from a more rapid development of Imperial Communications by means of regular air services. The Report also expresses the hope that the opening up next year of a regular service between England and South Africa will be followed at an early date by the extension of the regular weekly service between England and India as far as Australia.

The Report recommends that preference should be given to Empire air routes for the carriage of mails when the existing facilites offer equal advantages to the air routes of foreign services.

The Committee has felt unable to make any recommendations with regard to the further development of airships in view of the inquiry into the loss of the R.101.

Three specific recommendations for the favourable consideration of the Conference and of the various Governments of the Empire are made by the Committee. They are:—

(1) The *personnel* which now exists for liaison purposes should be appointed on a more permanent basis.

(2) The interchange of selected administrative and technical officers for service within the Empire is desirable.

(3) The technical officers of the various parts of the Empire should confer with a view to evolving a common standard of air-worthiness for the Empire.

## A DELICATE SITUATION.

As The Aeroplane has reported, the Junkers G 38 is at present touring Europe on what the Americans would probably call a good-will tour.

The latest news comes from Madrid where the crew of the G 38 have got themselves rather involved. Not only did Herr von Bentheim, who is in charge of the G 38, write to Major Franco who is in a military prison, but he and the members of the crew also left cards on the Major. As Major Franco has been imprisoned for having made public statements in favour of a republic the Spanish Government considers that it is justified in making a diplomatic complaint.

In spite of the fact that the German Ambassador called on the Foreign Minister to assure him that the German Government entirely disapproves of the action of the crew of the G 38, the departure of the G 38 for Lisbon was delayed.

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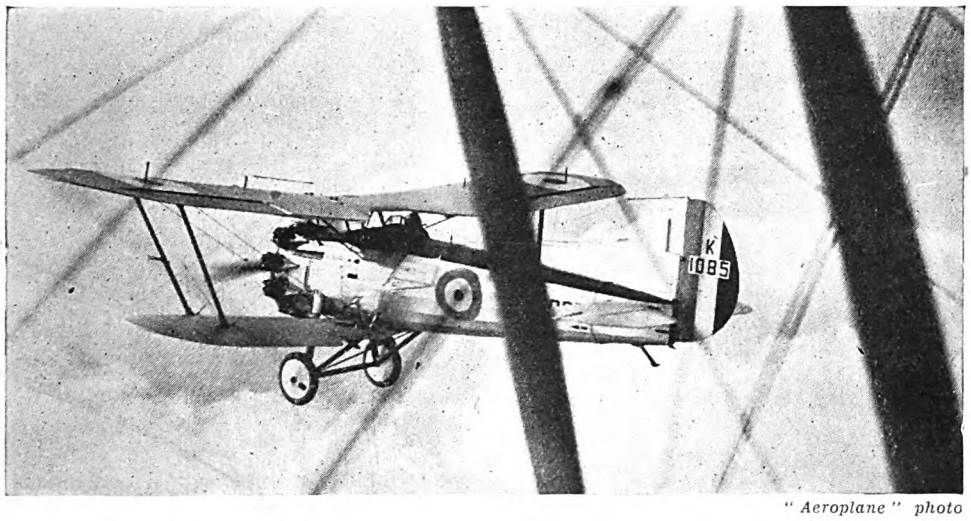
# "Bristol"




"Aeroplane" photo

The merits of the "Bristol" Bulldog All-Steel Single-Seater Fighter are best appreciated by squadrons of the Royal Air Force, the Royal Australian Air Force and the Air Forces of the several other countries which are equipped with Bulldog machines.

THE BRISTOL AEROPLANE CO., LTD.
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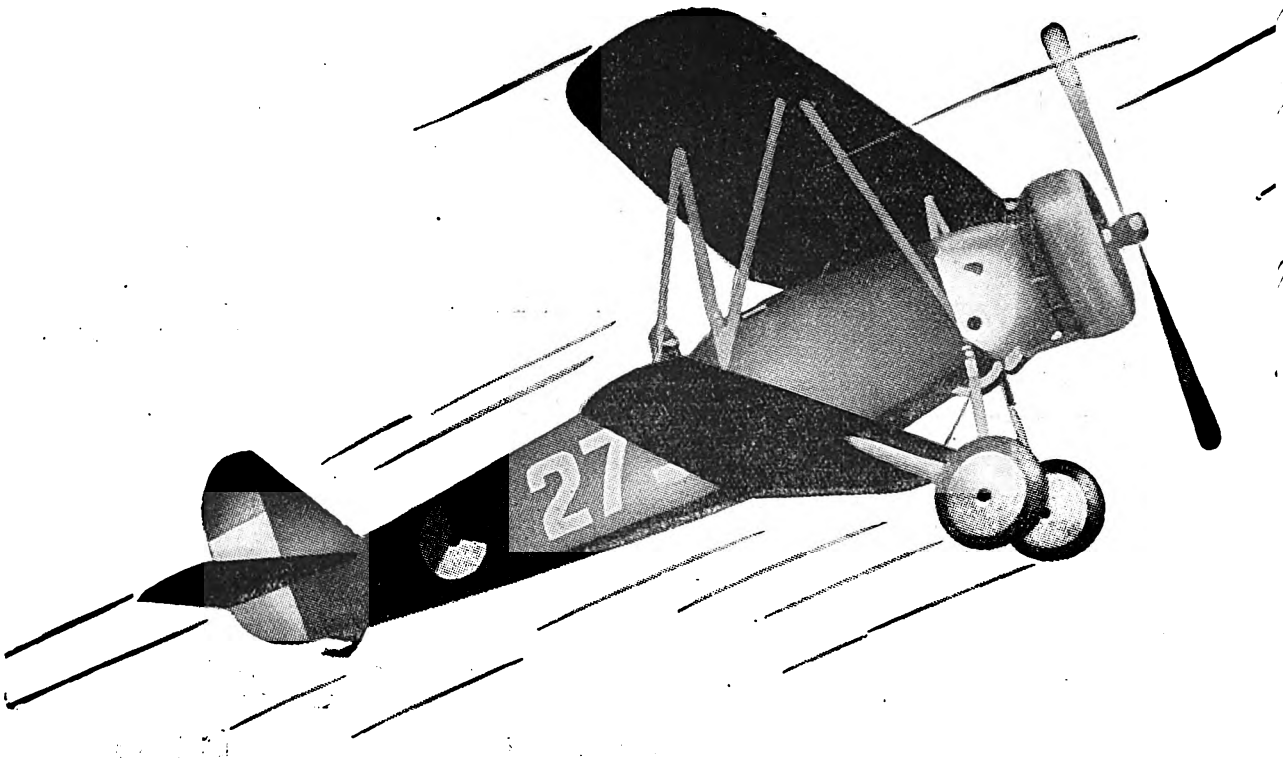
# FOKKER FAVOU
# RADIAL JAG




**PARIS AERO SHOW**

*November 28—December 14.*

*Armstrong Whitworth Aircraft and Armstrong Siddeley Aero Engines will be exhibited as below.*

**AERO ENGINES**

Stand **1** Gallery A

**AIRCRAFT**

Stand **24** Grand Aisle

The latest Fokker D XVI. super single seater fighter is fitted with 400 H.P. air-cooled radial ungeared and supercharged Armstrong Siddeley Jaguar engine.



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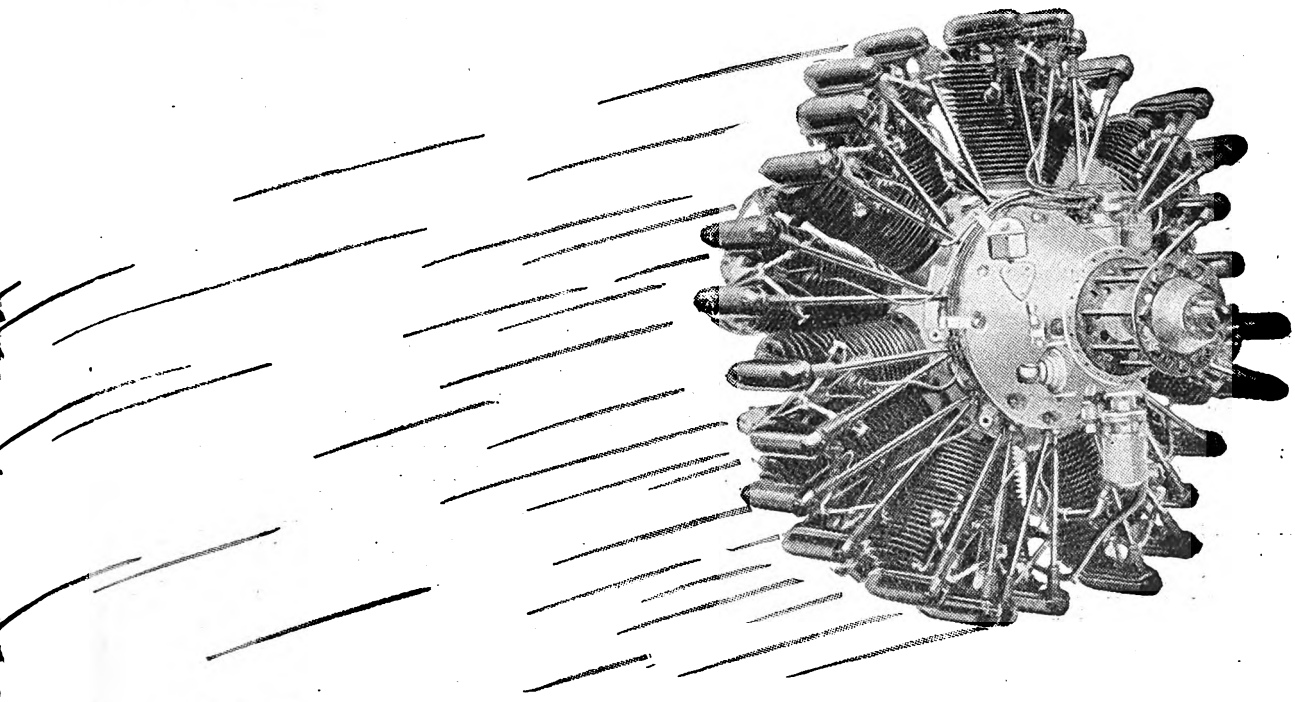
# RS AIR COOLED
# UAR ENGINE



## TO MEET DEMAND FOR LATEST SUPER SINGLE SEATER FIGHTER

THE compact design, light weight and remarkably smooth running of the air cooled radial ungeared supercharged 400 H.P. Armstrong Siddeley Jaguar engine makes possible a guaranteed speed of 200 m.p.h. at 15,000 feet and provides the finest possible manœuvring and aerobatic qualities.

ARMSTRONG SIDDELEY MOTORS, LIMITED, COVENTRY, ENGLAND
and 10, Old Bond Street, London, W.1.



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## RESERVE AND OTHER FLYING.

The following letter from a keen pilot is of interest. Its sound views need no comment:—

After months of waiting, the benevolent Air Ministry turned me down on the score of age. It was a blow, needless to say. Any flying I continue to do must still cost me hard cash, and a journalist with an all but negligible private income is not over-burdened with that!

This brings up a point, however, which you might think fit to air some time. Here am I, sound in mind and limb, at the stage in life when, I hope, I no longer take unnecessary risks—though still, unfortunately, possessing a love of the unknown and adventurous—turned down at the age of 26 when mere youths can get through. It is an open admission that the air is for the unimaginative.

This quality is perhaps necessary in the pilots of fighter squadrons, though even here I do not feel very certain. Look at Squadron-Leader Lowe, of "43," and at one of the soundest pursuit pilots of the war, Mannock, who was finally killed by a stray bullet from the ground.

Perhaps, though, the Air Ministry trains for a future, and hopes that when this "future" arrives its Reserve pilots will have reached the age of discretion. Surely, sound, rather than over-dashing, pilots are needed. Certainly the daily remarked death-roll would suggest it.

Now for another point. Don't you think that it is time that the flying papers openly admitted that the air, with present machines, is still unsafe? With a pilot killed every day, whether or no by his own carelessness, the public cannot be bluffed, and we may as well admit the truth to ourselves and fight manfully for the development of the obvious means of future human transportation. Whereas our daily press, with its James-Douglas-Hannen-Swaffer troupe of emotional contortionists, must go its own half-wit way, we can show without sentimentality that the cause of aviation is worth dying for so long as something is learned. The world slaughtered a million of its best manhood fifteen years ago, and learned nothing—not even the futility of it.

Even now, with perfect equipment and perfect pilots, flying *can* be safe, but the American and European boom has bred the idea that flying is as safe as walking, and half-trained young men loop and roll at five hundred feet. Even trained men make mistakes.

At a certain meeting this year, as you may remember, an instructor, to please the crowd, spun down to the absolute limit, and flew a Klemm, almost stalled, twenty feet over the heads of the crowd. A slip—and all the work of years would have been undone. Two thousand people, perhaps, saw his evolutions, but twenty million would have heard about the slaughter if that machine had dropped out of his skilful hands.

When will people grow up and forget their childish trust in Providence? Ground-strafing in a fast 'plane is the finest known sport, but it is not only the fear of personal injuries that stops me from playing at it.

With the sound sense which I once thought to be possessed by everyone you can do and are doing a lot to help aviation. I only wish that I could take a hand instead of writing thousands of words about motors—which have become stereotyped playthings for a people without imagination to amuse themselves otherwise. When I played Rugger I always liked playing on a losing side!

## AUTOMATIC LANDINGS.

A week or two ago *The Times* published an interesting and amusing account of an aeroplane in France landing safely in the dark without the pilot's knowledge, and the suggestion was made that this was the first instance of an aeroplane so landing. Perhaps those who read the story would be interested to know of two authentic instances of a similar thing happening in the past.

Shortly after the start of the Circuit of Britain in 1911 from Hendon, John Jacob Delaval Astley, flying a Bleriot monoplane, ran into fog, and, although in those days we had no turn-indicators or delicate instruments to show whether a machine was right side up or not, he continued flying more or less by instinct. To his astonishment he found himself in half an hour or so, running along the surface of a grass field, although his altimeter indicated that he was at a height of 300 feet.

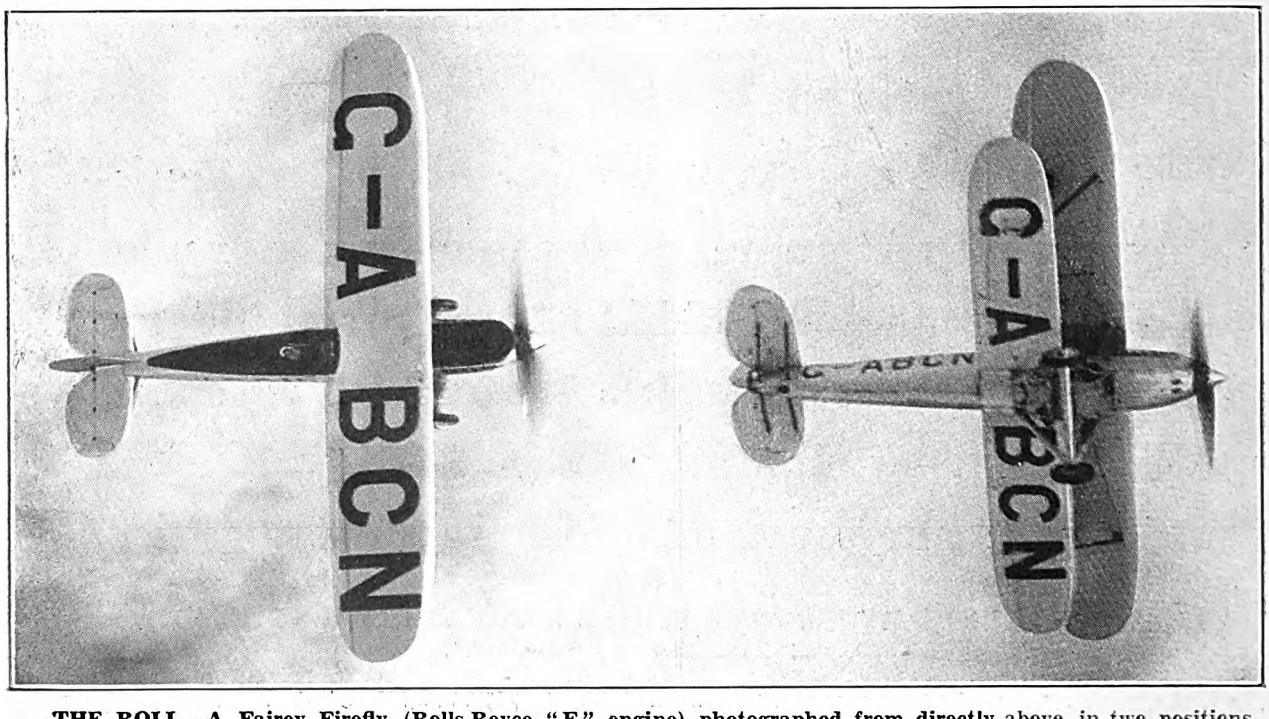
He switched off and stopped the machine and waited for the fog to lift. He then found that he had flown into an almost level field on the top of a hill not far from Bedford, which was at a height of approximately 300 feet. And in reaching the hill he had by sheer good fortune flown between two groups of trees.

A year or so later "Otto," as he was called by his friends, was killed when flying at Belfast, through driving his machine into the ground to avoid running into the mob when his engine failed.

The other instance was still more peculiar. Late in 1915 or early in 1916 a pilot in a B.E.2c was out on anti-Zeppelin night-patrol from the aerodrome at Joyce Green, near Dartford. After a couple of hours, as he was running short of petrol, and had seen nothing and had no idea where he was, —because, as you will remember, the countryside was rigorously darkened in those days,—he throttled his engine back and let his aeroplane sink gently, looking over the side the while in the hopes of seeing something in the way of a light, or possibly even the shape of a field in which he could land.

In this way he came down gently till his altimeter indicated 1,000 feet, and while looking intently over the side of the machine he felt his wheels bump on very solid ground. He at once switched off and after another bump or two came to rest unhurt.

When he had discovered his whereabouts he found that he was on the top of Leith Hill, which is the only piece of ground at a height of over 900 feet within about a hundred miles of London.




**THE ROLL.—A Fairey Firefly (Rolls-Royce "F" engine) photographed from directly above in two positions of a roll. In the left-hand picture, the pilot, Mr. Staniland, can be seen leaning back and looking up.**
—("*Aeroplane*" *photographs.*)

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# THE COMING OF THE Do.X.

After many alarms and some excursions on the part of would-be "rubber-necks," official reports announced that at 12.00 hrs. on Nov. 10 the Do.X had left Amsterdam, whither she had flown from Friedrichshafen on Nov. 2, and was on her way to Calshot. The flying ship arrived at Calshot about 15.30 hours.

The distance between the two places is under 300 miles as the crow flies, but the Do.X evidently followed the coast all the way. Therefore, as the wind was against the ship, the cruising speed would appear to be fairly high, certainly above 100 m.p.h. On the other hand, during the flight from Friedrichshafen the average ground speed was not high, but no wind-speeds were available.

When she arrived at Calshot a welcome was given to Dr. Dornier and his officers by Air Vice-Marshal Lambe, A.O.C. Coastal Area; Air Commodore Bigsworth, Commanding No. 10 Group; and Group Captain Nanson, Commanding Calshot Base.

Afterwards Kathleen Lady Drogheda, the Dowager Lady Swaythling, and Colonel the Master of Sempill went aboard and welcomed Dr. Dornier and his wife, who are travelling as passengers, and Captain Christiansen, who is in command.

Reports concerning the number of passengers and crew on board vary. An official statement says that three women were on board: Frau Dornier, the wife of the designer; Mevrouw Burgerhout, the wife of one of the directors of the Maatschappij Vliegtuigenbouw Aviolanda, of Papendrecht, Holland, who hold the Dornier licence for the Netherlands, and Lady Drummond Hay, a British journalist.

The Do.X has been thrown open to inspection by groups of interested people from the various aeronautical institutions in the country.

Dr. Dornier has expressed the hope that he will be able to leave for Lisbon and the Spanish coast on Nov. 13.

### AFTER THE ARRIVAL.

Dr. and Frau Dornier after debarking from the Do.X were brought to London by Colonel the Master of Sempill, who has been acting as guide, philosopher, friend and official host to them during their stay in England. In London they stayed with the Dowager Lady Swaythling.

In the evening Lady Swaythling gave a little reception to certain friends in London of Dr. Dornier, including Prince von Bismarck, from the Germany Embassy; Mr. C. R. Fairey, President of the Royal Aeronautical Society; Mr. Handley Page, Chairman of the Society of British Aircraft Constructors, and Mrs. Handley Page; Dr. Gerald Merton, President of the Air League, and Mrs. Merton; Mr. Lawrence Wingfield, Secretary of the Guild of Air Pilots and Air Navigators of the British Empire, and Mrs. Wingfield; Mr. Buchanan of the Air Ministry, and others.

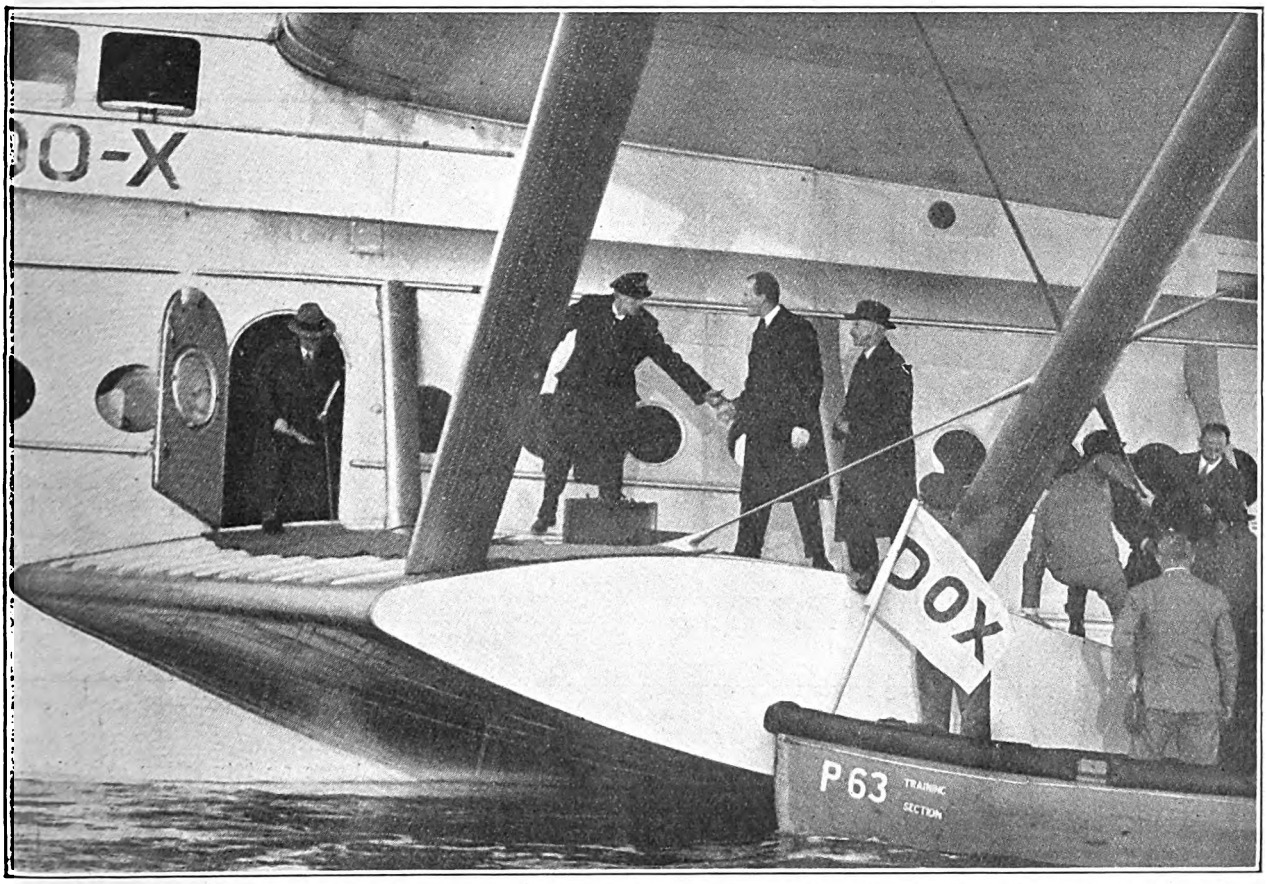
Dr. Dornier told one that so far the voyage had been without incident, and stated clearly that his plans do not at all agree with the newspaper reports which make out that the ship is definitely going to fly to America. Dr. Dornier is always an exceptionally modest man, as well as being an exceptionally able engineer, and he has never said that his machines are going to do anything. He is content to abide by what they do.

At the moment his intention is to fly to Lisbon if conditions are favourable, and he has no intention of butting into bad weather. He has complete confidence in his ship but he is not going to take foolish chances for the sake of publicity. He says that if he gets to Lisbon and if the conditions between there and the Azores are good he may fly to the Azores. And if he gets there and if the conditions are good he may go on to the United States.

Or if the conditions do not seem to be favourable for crossing the North Atlantic he may go down to the Canary Islands. After which if the conditions are still favourable he might possibly go to South America.

These wisely indefinite plans are worth noting because so many foolish things have been written about the Do.X. There is a tendency among some would-be clever people to jeer at the uncertainty of Dr. Dornier's plans, rather on the lines that because a number of people (who have been in fact extraordinarily foolish) have managed to fly the Atlantic in aeroplanes (which actually have been entirely unsuitable) a really big flying-boat such as the Do.X ought to be shot off across the Atlantic regardless of weather merely because it happens to be big. People who write and talk in that way are precisely of the kind who do harm to aviation by not recognising that an experimental aircraft should be used carefully on experimental flights.

Another matter on which newspaper stories differ from the truth is all this nonsense that has been written about the crossing of the Atlantic being prevented by a law action brought by Dr. Rohrbach against Dr. Dornier to obtain an injunction against the flying of the Do.X, and the defence that the Do.X was built in Switzerland where no Rohrbach patents had been taken out. The joke against




**GOING ABOARD.—Colonel The Master of Sempill (without hat) boarding the Do.X at the head of the Party of Welcome.**

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Dr. Rohrbach was alleged to be that he had omitted to take out patents in Switzerland because there was no Swiss Navy to use his invention on flying-boats.

Apparently the truth is that Dr. Rohrbach claims a patent on the idea of mounting his engines in separate housings distinct from the wings of an aeroplane, which has nothing to do essentially with flying-boats. Actually the same thing was done some years ago with one engine by Mr. Koolhoven in his three-engined monoplane, and by the Macchi people in a flying-boat, and it has been done more recently in this country by Saunders-Roe Ltd. And one seems to remember some still older examples.

There was, in fact, some talk of an infringement of the patent claimed by Dr. Rohrbach, but when Dr. Dornier took the matter up with the Chairman of the German Trade Association, which corresponds to our S.B.A.C., the attempt to get an injunction was withdrawn. Whether there may be an actual patent action to decide whether the idea is patentable or not does not affect the present voyage of the Do.X.

One of the most interesting personalities in the Do.X is Captain Christiansen, who is the *de facto* and *de jure* captain of the ship on this voyage. During the War 1914-18 Capt. Christiansen commanded that magnificent fleet of German war machines which operated in the North Sea and caused so many casualties to our aeroplanes, flying-boats and airships. He it was who instituted the scheme of going out into the North Sea with a big formation of high-speed seaplanes and sitting on the water till one of our patrols came along to be attacked.

Capt. Christiansen has refused to leave the Do.X so far during the voyage. He sleeps and eats on board and devotes himself entirely to the ship. He does not actually handle the controls of the vessel, but sits in his own control position and issues orders to the helmsman.

As the Do.X has been kindly thrown open to inspection by a number of approved representatives of British Aviation we hope to be able to publish something like an adequate description of the ship next week.

### Some Figures from Germany.

The following report on the Do.X, as it is since the air-cooled radial engines have been replaced by American water-cooled engines, will be found interesting:—

It seems that the chief reason for exchanging the 12 Siemens-Jupiter engines for 12 Curtiss Conqueror engines is due to the fact that from the outset difficulties were encountered in the cooling of the engines, especially of the six rear engines.

The twelve air-cooled engines were installed in six separate streamlined engine compartments, which were connected with each other by a small so-called "over-wing." Each engine housing contained two engines in opposite directions, of which the front engine had a wooden four-blade tractor screw and the rear one a two-blade pusher screw, which rotated in opposite directions. Already during the first test flights it appeared that the temperature of the oil in the rear engines was very high and furthermore the temperature of most of the cylinders of the rear engines was far too high.

In spite of several improvements made by the Dornier Works this super-heating could not be reduced satisfactorily. After a relatively short time of use the capacity output of the air-cooled engines was reduced considerably, until at last the output was not more than 300 h.p. instead of 500 h.p. This reduction in the capacity output of the engines was certainly due to the difficulties experienced in cooling the rear engine of each pair.

Owing to this reduction in the engine power from 6,000 horse-power to approximately 3,600 to 4,000 h.p., the performance of the Do.X was such that the plane had nearly no load capacity at all. Furthermore, it was not possible to stop even a single motor while flying, because the remaining engines would not have had enough carrying capacity to keep the machine in the air.

The idea of the constructor to provide extra safety by subdividing the total h.p. into twelve separate units therefore proved to be a failure.

These difficulties with the air-cooled engines also account for the fact that the maximum ceiling of the Do.X was not more than 420 metres.

This caused the Dornier Works to replace the air-cooled Jupiter engines by twelve water-cooled Curtiss Conqueror engines of 600 h.p. each. The greater weight of the water-cooled engines was partly balanced by some structural alterations to the aeroplane, and by the fact that the problem of cooling was not only far easier, but the durability of the engines was better.

These expectations have so far not been disappointed, although it is still too early to make a definite statement, as the test flights are still being carried on.

The structural alteration of the plane is clearly shown on the accompanying photographs. It will be seen that the Do.X now has no more "over-wing" (the small wing connecting the six engine compartments). It proved that this small wing had almost no lifting capacity at all, because it was located too close to the main wing and affected the flow over the top of the wing.

On the other hand, this over-wing and the streamlined access to the motor compartment were a considerable air resistance and, furthermore, of considerable weight, because the actual weight of the overwing was 18 kg. per sq. metre against 15.15 kg. per sq. metre of the main wing. The new motors are now installed over the top of the wing only on streamlined framework and are connected merely by two transverse tubes.

Performance figures of the Do.X with the new motors are difficult to get. The following figures are in no way definite as test flights had not yet been completed when they were sent—for instance, no altitude and speed test flights had been made as yet,—but they may be taken as being not far from correct:—

| | Old type engines Do.X with Jupiter engines. | New type engines Do.X with Conqueror engines. |
|---|---|---|
| Span | 48 metres | 48 metres |
| Length over all | 40.05 metres | 40.05 metres |
| Height over all | 9 metres | 9 metres |
| Maximum width over "Stummel" (see photo) | 10 metres | 10 metres |
| Maximum width of the boat | 3.5 metres | 3.5 metres |
| Height of the boat | 6.4 metres | 6.4 metres |
| Volume of the boat | 400 cub. m. | 400 cub.m. |
| Passenger accommodation, seats | | 70 |
| Draft empty | 0.8 metres | 0.8 metres |
| Draft at a weight of 50 tons | 1.05 metres | 1.05 metres |
| Wing area incl. ailerons | 486.2 sq. m. | 454 sq. m. |
| Weight empty | 28.000 kg. | 29.500 kg. |
| Normal flying weight | 48.000 kg. | 52,000 kg. |
| Maximum flying weight | 52.000 kg. | 56.000 kg. |
| Cruising speed per hour | 175 km. | 190 km. |
| Maximum speed per hour | 211 km. | 216 km. |
| Speed of start | 65 sec. | 52 sec. |
| Service ceiling | 420 m. | 500 m. |
| Absolute ceiling (theoretical) | | 2.100 m. |
| Maximum power output | 6.000 h.p | 7.200 h.p. |
| Petrol capacity | 16.000 litre | 19.000 litre |
| Oil capacity | 1.600 Litre | 1.600 litre |
| Petrol consumption per h.p./h. | 270 cr. | 220 cr. |
| Total fuel consumption per hour at full speed | 1.620 kg | 1.580 kg. |
| Possible performance: | | |
| Weight empty | 28.000 kg. | 29.500 kg. |
| Equipment | 500 kg. | 500 kg. |
| Crew | 1.000 kg. | 1.000 kg. |
| | 29.500 kg. | 31.000 kg. |
| Fuel (maximum capacity) | 14.000 kg. | 16.500 kg. |
| | 43.500 kg. | 47.500 kg. |
| Paying load at normal flying weight | 4.500 kg. | 4.500 kg. |
| Range hours | 9 | 10½ |
| Distance | 1.500 km. | 2.000 km. |
| At a distance of 1,000 km. the performance would be: | | |
| Total weight empty | 29.500 kg. | 31.000 kg |
| Fuel | 9.500 kg. | 9.500 kg. |
| Paying load | 9.000 kg. | 11.500 kg. |
| With no paying load the maximum range is now stated to be theoretically at max. flying weight: | | 4.300 km. |
| (against 3,600 of the old type Do.X with air-cooled engines), but it is not believed that the machine will attain such a distance. | | |

The above figures for both types have actually been attained.

It will be noted that they differ considerably from those issued by the Dornier Works some time ago covering the old type Do.X.

It is interesting that two ships of the Do.X type are now in construction at Altenrhein, near Rohrschach, for which orders have been placed by the Italian Government. For these two ships Fiat engines are to be used. The two ships in question are intended to be put in operation on the airline Genoa—Rome—Naples—Tripoli.

The price of the plane without motors is 2,500,000 marks. The price of the motors is stated to be 30,000 marks each.

## THE TESTING OF AEROPLANE CONTROLS.

A lecture which should give an interesting side-light into some of the methods which are used at the R.A.F. test-station for aeroplanes at Martlesham Heath will be given on Nov. 13. This will be read by Mr. H. L. Stevens and will start at 6.30 p.m. or 18.30 hrs. in the lecture hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2.

People are reminded that these lectures are open to anybody who is interested and admittance can be obtained by signing the visitor's book in the lobby.

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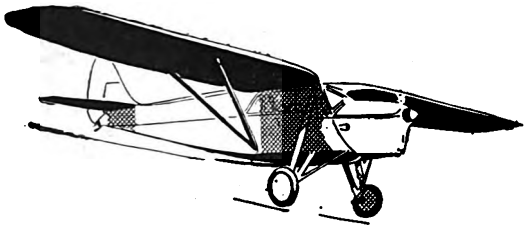
# PRESS OPINIONS *of the* PUSS MOTH



IN THE 'GRAPHIC'
LT.-COL. W. A. BISHOP, V.C., SAYS:

". . . this unique aeroplane, British right through, is not merely a step forward in progress. It is a big stride.

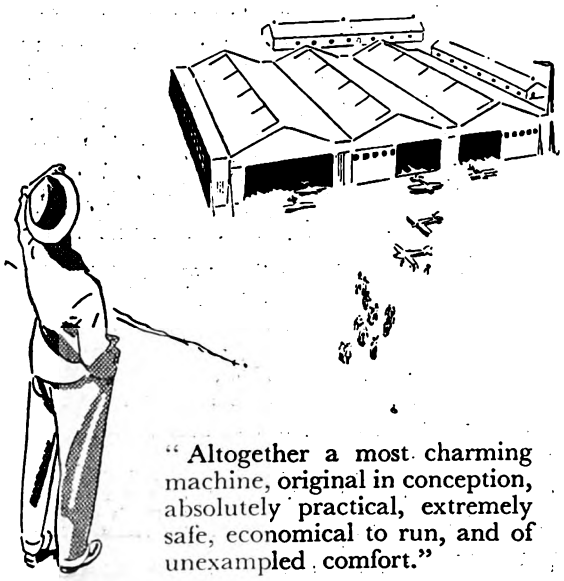
". . . just about one of the finest things that British engineering imagination and enterprise have ever accomplished.

" The Puss Moth is definitely a machine of the 'high performance' type.

". . . visibility is as near perfect as it can be . . .

". . . in flight she is like a luxurious motor car.

" I say that the Puss Moth is an epoch-making machine, because it announces the possibility of an entirely new standard of flying comfort.



" Altogether a most charming machine, original in conception, absolutely practical, extremely safe, economical to run, and of unexampled comfort."

IN 'THE TATLER'
MAJOR OLIVER STEWART, M.C., A.F.C., SAYS:

" To own a Puss Moth is the ambition of all right-minded pilots . . .

" It is a machine in which air travel can be carried out as comfortably as possible, the view is good, the performance high, and the running costs low."

IN 'THE BYSTANDER'
CAPTAIN C. E. WARD, A.F.C., SAYS:

". . . it is a wonderfully graceful

machine, and has a much higher performance than any other standard light plane."

IN 'COUNTRY LIFE'

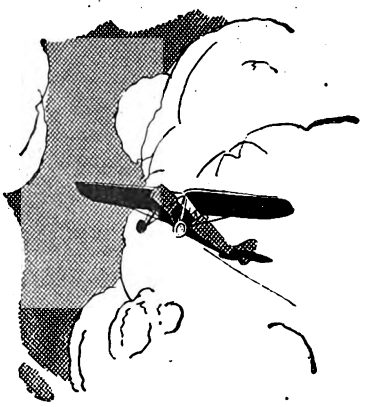
". . . it (the Puss Moth) provides the most restful form of travel that can be imagined.

" One must salute the Puss Moth as the apex of virtuosity in light aeroplane design."

IN 'THE EVENING NEWS'

". . . certainly the very last word in comfort.

" The machine simply leapt off the ground, and reached 1,000 feet in less than a minute."

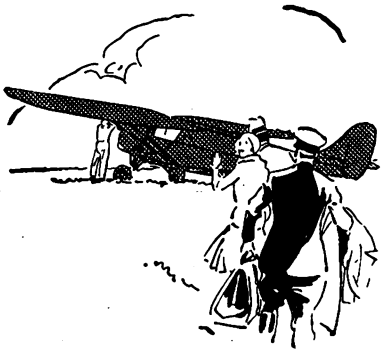


IN THE 'DAILY SKETCH'

". . . the biggest step forward in light aeroplane construction for many years."

IN 'THE TIMES'
IMPERIAL AND FOREIGN TRADE AND ENGINEERING SUPPLEMENT

" It would be difficult to get a better all-round view in any private machine . . ."



IN 'THE TIMES'
THE LATE MR. C. G. COLEBROOK SAYS:

" I have never yet seen another machine of this class with such a perfect view."

**THE DE HAVILLAND AIRCRAFT CO., LTD.**
STAG LANE AERODROME, EDGWARE, MIDDLESEX
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## THE R.101 INQUIRY.

The Inquiry into the loss of the R.101, a condensed report of the first week of which appeared in THE AEROPLANE last week, was continued on Nov. 4.

Wing Commander T. R. Cave-Browne-Cave, C.B.E. (an officer of the R.A.F., formerly an engineer-commander, R.N., attached for Special Duty to the Royal Airship Works at Cardington in connection with the engines) said that on June 26, just before the airship got to the mast on her return, she dropped two one-ton tanks of emergency fuel oil. The height of the ship was approximately 1,000 ft. The oil was of the same viscosity as ordinary paraffin lamp oil but rather darker in colour. He watched the oil falling and it broke up almost as quickly as water did. By the time it was 200 or 300 ft. below the airship it was a fine cloud which would not retain any forward velocity from the ship but would move only with the air. Twelve hours later he had examined the ground and found that the oil covered a patch about 200 ft. long and 40 ft. wide. Part of the oil had fallen on a tarred and sanded road and it looked like a wet road. Some had fallen on grass and made it appear like wet grass, only by looking carefully could it be seen that it was wet with oil. He did not think if the ground had been wet or it had rained on it afterwards that any trace of oil would have been found.

Dr. G. C. Simpson (Director of the Meteorological Office) said that in January 1925 a special organisation was set up to deal with meteorological problems connected with airships. Mr. Giblett who had died in the ship had been in charge of that division.

The weather chart given to R.101 when she started, together with the later charts sent by wireless, the last being an hour before the crash, were then produced.

Dr. Simpson explained that the first chart showed that there was a depression moving eastwards. The second chart indicated an increase in wind velocity, and the third chart, at one o'clock on Sunday morning, showed the centre of the depression to be over the north of Scotland with a rapid gradient right away to the south of France. Those on board the airship had been warned that they were likely to meet high wind and rain over northern France. A forecast was given that when the airship was over London the velocity of the wind at 2,000 ft. would be 40 to 50 m.p.h. It was calculated afterwards that that forecast was accurate. Mr. Giblett had no assistant on board, as his was not a continuous job. The airship would have met far worse weather four hours after the crash.

The Solicitor-General asked whether the night was such that meteorologists would envisage the possibility of there being up and down air currents. Dr. Simpson said that he should say that they were definitely excluded. The question of the effect of rain had been considered. Before the disaster the ship had been in moderately heavy rain which did not affect navigation. Rain would make the ship heavier and a calculation showed that the weight acquired by rain falling on the envelope would be four or five tons.

Dr. Simpson then handed to the Court a minute by Sir Sefton Brancker on the subject of weather he had met when flying over Beauvais in February 1928.

Sir John Simon said that this was a memorandum of a flight in an aeroplane and related to one journey over a route which was traversed many times a week by aviators flying between London and Paris. If this particular spot in the air was like Portland Race, which every yachtsman wanted to keep out of, the conditions would not happen once but constantly.

After the Court had examined the contour map of the Beauvais area, Dr. Simpson said that one would expect the area to be bumpy at the height of 1,500 ft. to 2,000 ft., but the meteorological officer on board would be well aware of the physical state of the atmosphere. He added that Mr. Giblett would be with the officer on watch if there was the slightest question of difficulty. Replying to Sir John Simon, he said that there was nothing to indicate that they ran into an unexpected thunderstorm. There would be some eddies in the air along the ridge south-west of Beauvais but not more than enough to make the air bumpy. The distance between the gusts and the lulls would be about the length of the airship. He had said in his draft report that a well-found airship flying at 1,500 ft. should experience no difficulty, and had taken it out of the report because the meteorological experts had said: "What do you know about the navigation of an airship?"

A letter from Dr. Eckener was produced by the Solicitor-General. It said that when flying the *Graf Zeppelin* from Friedrichshafen to Leipzig on the Sunday morning of the disaster to the R.101 he had experienced a large barometric drop which was very rapid and was associated with a squally front travelling across Europe. That squall did not arrive in France until several hours after the disaster. Dr. Eckener had also said that any fault in the altimeter seemed to be improbable.

Continuing his evidence, Dr. Simpson said that the R.101 had never experienced more than a moderate wind of about 15 m.p.h. in her previous flights. The dips at the time of the R.A.F. Display were caused by the unstable atmosphere. She had not experienced such gusty weather as that of the last flight but she had experienced more unstable weather. He agreed with Sir John Simon that in the last flight the natural phenomena were not a visitation of God so extremely rare that the people could not have anticipated that this was going to happen.

Replying to Mr. Teed, Dr. Simpson said that the weather conditions in June would tend to produce pitch on the part of the airship, gusty conditions such as on the last flight would produce rolling and shorter pitches.

Major J. P. C. Cooper (Air Ministry Inspector of Accidents) described the wreckage and the examinations which had been made. He said that the airship had telescoped from 777 ft. to 689 ft. He was very much struck by the fact that very few saplings or young trees were broken by the fall of the airship—a tree 10 to 12 ft. high was practically undamaged—suggesting that the R.101 must have come down very gently. He had come to the conclusion that the fore part was the first to strike and that the ship, having struck the ground at an angle between 15 and 25 deg., had then bounced and moved forward a distance of between 60 and 70 feet. He thought that the speed of the ship in relation to the ground was 20 to 30 m.p.h.

In an extract from the Committee's Report Major Cooper mentioned that the telegraph indicator in the aft midship engine car stood at "Stand By" and that in the port midship engine car at "Slow." The Report also stated that the Committee were convinced that no part of the fabric on the fin had been torn off in the air and that there was no mechanical defect in the elevators or their control levers, all the moving parts operating freely. Replying to questions Major Cooper said that the apparatus which brought the elevators to normal, if there were a break in the cable, appeared to be intact. The springs were in place although the heat might have taken the temper out of them. The elevators were drooping and swinging about in the wind. The Report also said that the number of turns of cable on the drum of the elevator control wheel in the cabin corresponded closely with the number of turns on the auxiliary control drum in the bottom fin. Major Cooper agreed that the turns were such as to show that the coxswain in the cabin had turned his wheel so as to get a "full-up" elevator.

The report continued that one cable leading forward from the auxiliary drum was broken, and the other cable, for pulling the elevator up, was intact, but badly damaged, having apparently been crushed between pieces of wreckage. In the final closed circuit of cable operating the elevator, a fracture had occurred on the side which would be pulled to raise the elevator, and that fracture was close to one spliced end of the short length of cable inside the tensioning spring. The spring itself was extended to several times its normal length, but was not broken. On the evidence available the committee had been unable to arrive at a definite conclusion as to the cause of the fracture of this particular cable.

Sir John Simon said that there was a gas-bag near from which hydrogen could have escaped and said, that, to a layman, the most remarkable thing about this part of the case was that within half an inch of where the wire had parted there was a piece of binding, of fabric, and it was obvious that the binding had not been exposed to anything like the heat to which the cable was subject at the point of fracture.

Engineer A. J. Cook, recalled, said that looking back towards the tail of the airship, after he escaped, the only part on which he saw any fabric was the port elevator, which was in an upright position. There was no smoke obscuring that part of the ship and the tail was in the air.

Major J. P. C. Cooper, in reply to Sir John Simon, said that he found no evidence himself on visiting the wreck to show whether the oil tanks were full or empty.

Flight Lieutenant R. J. Montgomery-Moore, R.A.F., who went to Beauvais after the accident as an interpreter, said that he had traced the origin of the rumour that masses of oil had been found to a farmer who had found two quite small patches of oil on the ground. A civilian in charge of the landing ground at Poix, who had said that he was used to judging the height of aeroplanes, had estimated the height of the airship at 100 metres, and his opinion was unshakable. He had also said that the aerodrome was 185 metres above sea level and the highest spot in the neighbourhood. The witness saw one tank which was three-quarters full of oil, but he did not know whether it was a fuel tank or an emergency tank.

Squadron Leader Booth said that it was a storage tank. Replying to Sir John Simon, Sq. Ldr. Booth said that it was the practice at Cardington to set the altimeter at ground level, which was 60 or 70 feet above sea level.

Sir John Simon said that in that case, assuming orders had been given to keep the ship at a height of 1,000 ft., calculated from sea level, the estimate of 100 metres over Poix would be about right. He asked whether Sq. Ldr. Booth thought it remarkable that the ship should be kept at 1,000 ft. over country like that round Poix. Sq. Ldr. Booth said that he would have expected the airship to go up over country like that round Poix.

Mr. Disley, recalled, said that at midnight he saw Mr. Giblett plotting out on his chart information received by wireless. When he escaped from the airship he walked two or three times round the tail and distinctly saw the underside of the elevator. The fabric appeared to be complete.

Air Marshal Sir John Higgins (Air Member for Supply and Research until last August) described the programme of airship construction that was laid down when he took office in 1926. Two airships of 5,000,000 cubic feet capacity were to be built and it was anticipated that they would each take 100 tons to India. They were nearly double the size of any airship built before. The structure weight in both ships was heavier than was expected.

R.101 was finally inspected and ready for flight on Oct. 5, 1929. There had been a delay of nearly three years, due partly to the need for research work before the design could be fixed, partly to the design and making of the girders, partly to difficulties in getting the materials required.

The engines took longer to develop than was expected, and they proved to be 5 tons 16 cwt. heavier than was estimated. The ordinary test for aero engines was 50 hours' running, of which not more than 10 hours were continuous, with one hour at full power. The R.101 engines were run 100 hours at full power and were run 225 hours in all, the last 50 hours continuously. As far as he knew that was the most exacting test any aero engine had ever done.

Sir John Simon said the Court was quite satisfied about the tests applied to the engines.

Sir John Higgins went on to say that he went on the first flight of R.101 and that flight and others in 1929 were extremely satisfactory. The airship was also at the mooring mast during parts of October and November, and on Nov. 11 rode at the mast through a gale of 83 m.p.h., a very high test of the strength of the ship.

Sir John Simon then read an extract from Col. Richmond's diary dealing with this gale. This was:—

"The ship experienced a very severe gale. The highest gust recorded was 83 miles per hour. There were gusts of over 70 miles per hour for a considerable period. The maximum force recorded was 10 to 12 tons with an average considerably below it. A severe line squall passed over the ship at 1.30 on Tuesday morning, in which there was a change of 135 deg. in the wind direction in about one minute. The

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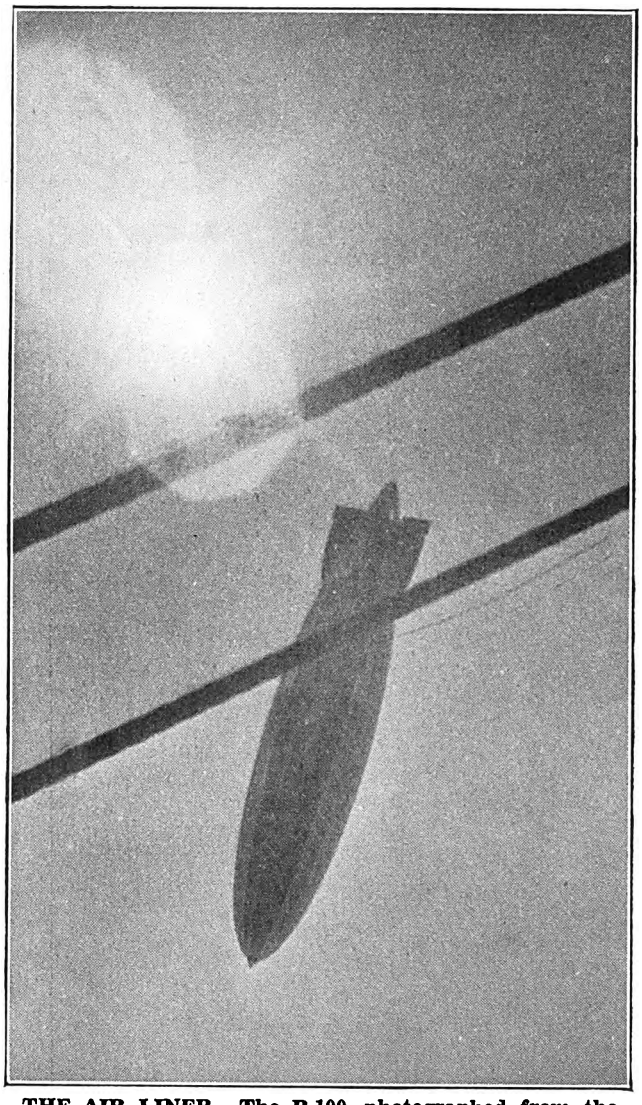

**THE AIR LINER.—The R.100, photographed from the deck of s.s. "Duchess of Bedford" in mid-Atlantic.**
*(Photograph by Mrs. F. C. Halahan.)*

average velocity during the change was 35 miles per hour. This produced a force on the bow of 15½ tons. The wind was accompanied by torrential rain and a hailstorm. A considerable quantity of water came into the ship due to the imperfect sealing of the cover where the wires passed through. The ship rolled continuously through about 5 deg. or 6 deg. The gas-bags chafed on the sharp corners of the radial struts, and this produced a good many holes in the bags."

Sir John Higgins said that earlier the ship had been put in the shed because of gale warnings and he had written a letter of explanation of the reasons for that. Lord Thomson's reply contained the following paragraph:—

"The right policy to pursue is to go on steadily with the progressive experiments and thus enable the full results of our extensive programme to be achieved. I do not anticipate any difficulty arising from weather conditions in the future if a slow and sure policy is insisted on from the first."

A minute dated Nov. 21, 1929, was read, in which Sir John Higgins wrote that certain alterations would have to be made to R.101 which would take three months to complete and would give a disposable lift of 44 tons, "with which she ought to be able to fly to India and back in selected weather." The minute added that to make the airship suitable for regular operation between this country and India it might be necessary to insert an additional bay increasing the capacity to 5,500,000 c.f.

In reply, Lord Thomson wrote on Nov. 28 that he was of opinion that no good, and quite possibly some harm, might be done by a flight to India in the early months of 1930. He thought the best course would be to make the alterations suggested, to insert the extra bay, and to make every effort for a flight with 55 tons disposable lift to India and back at the end of September, 1930.

In reply to Sir John Simon, Sir John Higgins said the disposable lift was then 38 tons. It had been hoped during the period of design that it would be 60 tons.

He added that the structure weight came out heavier than was expected. The estimate had been based on previous ships. This ship was designed to be much stronger and the allowance made in the estimate was not nearly enough.

Extracts from a letter by Col. Richmond, dated Jan. 22, 1930, were read.

Sir John Simon asked Sir John Higgins what he understood the following to mean:—"What all this comes to is that a 5,000,000 cubic ft. airship, according to current British ideas (underlined), is not suitable to carry 100 passengers for journeys to the East at all times of the year."

Sir John Higgins said he thought Col. Richmond had in mind to some extent that the quarters and the passenger accommodation on both R.100 and R.101 were very much more luxurious, certainly much more elaborate, than anything which had been put in airships like the *Graf Zeppelin*. A good deal of weight came from the passengers' quarters. He did not think Col. Richmond meant to imply that, even if they cut down the passenger accommodation to a minimum, they could really carry 100 passengers at all times of the year with only one mooring tower and a 5,000,000 cubic ft. airship. They came to the conclusion that with only one mooring tower between England and India they would have to have a gas capacity of somelike 9,000,000 cubic ft. to have a safe margin of fuel at any time of the year.

Sir John Simon read another extract:—"Either we must have our stopping places closer together or our ships larger, or both. I am afraid there is no doubt about the second."

Sir John Higgins agreed that Col. Richmond had come to the conclusion at this date that if they wanted an airship with an adequate range throughout the year it must be larger.

Sir John Higgins said that he saw no written reports of the flights in June. He had a conversation with Wing Commander Colmore, who said that the new arrangement of the wiring was causing chafing to some of the gas-bags. Colmore said that the chafing was quite easy to deal with by suitable padding, and it was, in fact, done at once. Colmore gave him the impression that this chafing frequently happened in previous airships and was not looked upon as anything serious. Colmore had no anxiety about it, and he (Sir John) was satisfied.

The witness spoke of an interview he had with Lord Thomson on July 1. "Rather to my surprise he said that if the modifications to R.100 were not satisfactory the flight to Canada could not be made, but nothing must delay the preparation of R.101 for the flight to India."

Sir John Higgins went on to say that on Oct. 4 at Wing Commander Colmore's invitation he went to Cardington to see the R.101. Major Scott had told him that everything was very satisfactory with the exception of an oil cooler and that the ship actually controlled better than before the new bay was put in.

Sir John Simon quoted from a report of the trial flights with reference to the chafing of gas-bags and the suggestion that this could only be satisfactorily cured by providing clearance between the wiring and the inner rings. Documents were read to show that to increase the lift, and because the designer was satisfied that a smaller margin of clearance would be satisfactory, some of the gas-bag wires were lengthened.

Sir John Simon referred to a report by Flt. Lt. Irwin on the enlargement of the gas-bags after the Hendon flight, in which he said "A report on the gas-bags will be rendered later on."—The Court had been asking for this report for best part of a week. Mr. Wilfred Lewis intervened to say that it had now been found at Cardington.

Replying to Sir John Simon, Sir John Higgins said that he was the person who took the responsibility for deciding that the gas-bags should be given less clearance. Sir John Simon said that he did not want him to take the responsibility out of chivalry,—somebody must have had the deciding voice.—And Sir John Higgins said that he himself had.

Later Sir John Higgins said that if the new bay had not been put in he would have had a 48-hour test but as she had done a flight of 31 hours, so far as technical information was concerned he would have been perfectly satisfied to recommend the ship for a certificate of airworthiness. He would have been satisfied with a satisfactory test of a reasonable length of the ship in its lengthened shape. His was the responsibility for altering the ship.

Replying to a further question Sir John Higgins said that the ship was put through a full speed trial of four engines on Nov. 2 and 3. Sir John also said that he would have expected the new bay to have a good effect on the controls because the Germans always said that the original design was too short.

A letter from Dr. Jones dated Jan. 24 said: "I think the figures are satisfactory, and that the stability sacrificed will not be serious. You will still be better off than R.100."

Referring to trial flights, Sir John Higgins said that the expression "further flight trials" was general. If the first were satisfactory he would consider that enough. Had there been time another short flight would probably have been made to do full speed trials, so that information could have been got about actual speed instead of estimated speed and also details about the consumption of fuel at full speed, but he did not think that there would have been an extended series of trials. He would have wished to conserve as many running hours of the engines as possible for the trip to India.

Sir John Simon said that it was important to have a clear view of how far the observations of the behaviour of the gas bags or valves or wires during the trials of the airship had been brought to the attention of the responsible authorities at the Air Ministry. Flt. Lt. Irwin had reported after the Hendon flight that the loss of gas would not account for the heaviness of the ship. Was the organisation such that no responsible official at the Air Ministry would have that report before him.

Air Marshal Sir John Higgins said that the Designer had considered the report and had talked it over with Wing Cdr. Colmore. If they did not consider it of importance they probably would not send any report to him (Sir John Higgins) as the head of his branch. The Director of Aeronautical Inspection was under the Department of Supply and Research, but points affecting inspection and design would be sent to the Director of Aeronautical Inspection and would be the subject of discussion. Unless there was some disagreement it would not be brought to him.

Sir John Simon said that it was a serious matter that Flt. Lt. Irwin's report would not pass from Cardington to the Air Ministry. Sir John Higgins said that Wing Cdr. Colmore was the responsible officer so far as development went. Wing Cdr. Colmore was the judge of whether reports on the behaviour of the ship in flights were of sufficient importance to pass to the Air Ministry.

Sir John Simon referred to a document which had just been supplied to the Court containing reports on gas-bags. He said that on July 8 Flt. Lt. Irwin sent in a report on the gas-bags of R.101 with a list of the holes found, in which he said that in many cases the gas-bags had been almost punctured by rubbing on longitudinal bolt-heads and radial struts. The number of nips to bags was negligible.

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because the bags could be positioned much more accurately. The holes caused by chafing on bolt-heads were approximately ¾ of an inch. This report seemed to have passed from one important official at Cardington to another, and Col. Richmond wrote to Wing Cdr. Colmore that the number of holes, although serious, was less than he suspected.

There was also a minute from Wing Cdr. Colmore to Lt.-Col. Outram in which he wrote:—"I feel sure that you will agree that we cannot accept as a matter of principle that the gas-bags in an airship should be clear of all girders. Also I expect you will agree that we cannot accept padding as being a satisfactory method of preventing holes forming in the gas-bags."

Sir John Higgins said Col. Outram's recollection was that in the original minute the second sentence read "we *can* accept padding." Unless it was read in that way it was impossible to understand the next sentence: "We have little doubt that padding will be a permanent remedy."

Sir John Simon said that apparently the only occasion on which the airship travelled at full power was on her Isle of Wight trip and asked whether that was a satisfactory state of affairs.

Sir John Higgins replied that the object of such a trial was to see the effect of speed on the envelope and to discover whether she could attain her calculated speed. The trial had been regarded as satisfactory for those two purposes.

Referring to the decision to defer lengthening R.101 because she might be wanted to go to Canada instead of R.100 Sir John Simon said that on being notified of this delay Lord Thomson had written:—"I must insist on the programme of the Indian flight being adhered to, and I have made my plans accordingly." He asked whether that had any influence on the course of events.

Sir John Higgins said that it influenced the course of events to the extent that he then realised that the Secretary of State was quite determined to have the ship ready to go to India at the end of September if possible and every effort was made to speed up the work.

Lieut.-Col. Moore-Brabazon suggested that an urge was imposed on the whole airship organisation and on the Air Ministry towards starting on a certain date. He asked Sir John if he could dismiss from his mind that the Secretary of State had wanted to go to India himself, would he, in view of the fact that the airship was practically a new airship, that the position of the gas bags had been changed, that they were running for the first time on five engines and had never had a full test on four, and that an extra bay had been put in, ever have given orders for the airship to start for India after only one trial flight.

Sir John Higgins said that he did not think that was an entirely fair way of putting it. Naturally the urgency of the Secretary of State wishing to go to India at that date might have influenced matters in the way of speeding up preparations. He would say that he would have been satisfied after hearing from Wing Cdr. Colmore and Maj. Scott that the trial flight had been satisfactory and that the ship was quite safe to go to India. He did not think it would have been difficult for any of those officers to have delayed the flight by putting in a request for further trials.

He had told the Secretary of State frequently that he must not count absolutely on the airship being ready to go out to India and unless the trials were satisfactory he would not be able to go at that time. The Secretary of State had appreciated that and if anyone had thought the trial not satisfactory there would have been no difficulty in saying so. Wing Cdr. Colmore and Maj. Scott and Col. Richmond were very careful and methodical and if they had been in doubt about any point in the ship they would have said so.

Sir Walter Nicholson, Secretary of the Air Ministry, gave evidence about a conference at the Air Ministry on Aug. 29 at which Wing Cdr. Colmore and others were present. Most of the discussion related to future policy and the minutes were secret. At the request of the Solicitor-General Sir John Simon was shown the minute and after reading it said it related to future policy with which the inquiry was not concerned.

Replying to Sir John Simon, Sir Walter Nicholson said that to his recollection at this conference no one raised the point with Lord Thomson that the altered R.101 had not done any trial flights.

Lieut.-Col. Moore Brabazon asked whether when the question of who was to go on this flight was discussed anyone pointed out that in the event of disaster there would be no one of experience left. Sir Walter Nicholson said no.

Sir Walter Nicholson said that Lord Thomson and Wing Cdr. Colmore were full of confidence and there was no emotional atmosphere about the thing one way or another.

Air Vice-Marshal Dowding said that when he took office Sir John Higgins had told him that the men at Cardington were enthusiastic about airships but their advice would not err on the side of rashness.

Sir John Simon asked whether the Air Vice-Marshal knew that when he took office Professor Bairstow and Professor Pippard were still considering the airworthiness certificate, and had raised the matter of the airship pitching down by the nose with one gas-bag deflated.

Air Vice-Marshal Dowding said he did not know that all the talk of the officers was about the gas-bags of R.100. They were not quite happy about them, but his impression was that they were satisfied with the gas-bags of R.101.

Referring to the shortening of the trial flight, the witness said he himself was anxious to go in the ship, but if it was to be out for 24 hours it would interfere with an engagement he had at the Admiralty. When Wing Cdr. Colmore suggested that the flight should be curtailed he asked whether the suggestion was made for that reason and Wing Cdr. Colmore replied that it had nothing to do with it. Wing Cdr. Colmore added that the proposal was made: "So that we may have a chance if all goes well of starting on Friday evening. We shall then have all Thursday to work on the ship as well as Friday." The witness went on the trial flight and the officers seemed to be very pleased with the ship.

He had not seen any written report of how the airship behaved and as far as he knew there was not one in his Department.

Speaking of an interview with Lord Thomson, on the Thursday night before the last flight, Air Vice-Marshal Dowding said that Lord Thomson had said that Wing Cdr. Colmore was his adviser and he would support him on any line that seemed good to him. When Saturday evening was suggested at this meeting, as the date of departure Lord Thomson's comment had been that he was anxious to start on Friday but tthey must not let his impatience influence their considered judgment. The witness had pointed out to Lord Thomson that the ship had not done full-power trials and that he proposed to instruct Wing Cdr. Colmore to do them as soon as possible after leaving the mast, so that if the trial was not satisfactory there would be time to abandon the flight to India. If the airship only went at cruising speed Wing Cdr. Colmore was not complying with these instructions but the witness did not know what the reasons were.

Referring to a document headed "Flight Instructions to Captain R.101," Sir John Simon asked Air Vice-Marshal Dowding whether he knew whether there was anything in this very elaborate document of several pages, anything about having a full speed test as soon as possible. The Solicitor-General said that there was nothing there. Sir John Simon said that it looked as if what the Air Vice-Marshal said to Wing Cdr. Colmore never got as far as this document. Replying to the Solicitor-General the witness said that there was nothing in the messages that came from the ship to indicate that such a trial had been made.

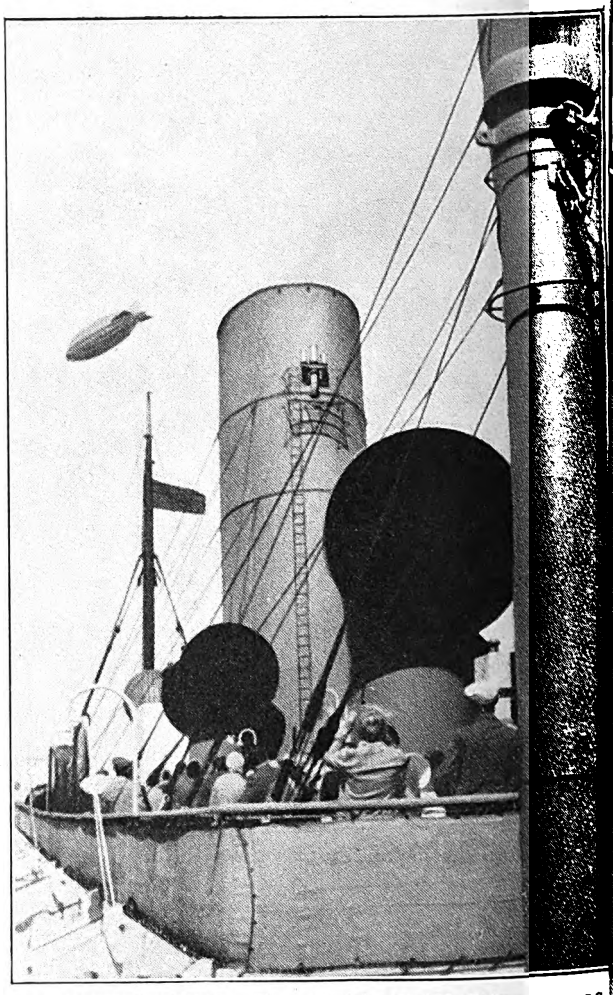
Sir John Simon said that on May 29, 1929, Flt. Lt. Irwin who was going to be Captain and Lieut.-Cmdr. Atherstone who was going to be first officer had suggested a programme of trials which included five flights, the last of 48 hours under adverse conditions. the ship to be flown for at least six hours at continuous full speed in bumpy conditions and the rest of the flight at cruising speed.

Air Vice-Marshal Dowding said that he did not know that this was ever adopted as official policy. It seemed very prudent and sensible but as it stood it was only Irwin's opinion of what good procedure would be.

Sir John Simon said that a similar document was signed on the same date by Lt.-Cdr. Atherstone. The Solicitor-General said that he understood that Wing Cdr. Colmore had asked Maj. Scott to get suggestions about the form that the trials should take from all his officers. These suggestions were put forward five months before the airship was completed and might have been modified after the first trial flight

Replying to Sir John Simon Air Vice-Marshal Dowding said that the conditions in which the only trial flight after the airship was altered was made were not perfect, they were at the end rather difficult. Sir John Simon read from Col. Richmond's diary that flying conditions were very perfect, and added in reply to the witness that Col. Richmond did not say anything about missing the mast twice.

(The report of the remainder of the Inquiry before it was adjourned on Nov. 10 will appear next week.)



**TRANSATLANTIC.—The Airship R.100 flying over s.s. "Duchess of Bedford" during her flight to Canada and back.** —*(Photograph by Mrs. F. C. Halahan.)*

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## AN R.101 MEMORIAL.

An announcement in *The Times* states that it has been proposed to open a fund for the provision of a suitable memorial to those who lost their lives in the disaster to the airship R.101.

The surroundings of the grave at Cardington preclude the erection of any very elaborate structure, and it is hoped that sufficient money may be forthcoming not only to erect a suitable memorial but also for such purposes (*e.g.*, education of children or assistance to dependents) as may be best suited to perpetuate the memory of those who lie buried at Cardington.

Donations should be sent to the Mayor of Bedford, at the Town Hall, Bedford, marked "R.101," and will be acknowledged in the Press.

In this connection one may remind people that the municipality of Beauvais has offered the scene of the crash to the British Government as a suitable site for a memorial.

All of which is very touching. But many will ask again, why all this about R.101 when nothing is done to commemorate the victims of R.38, and why there is no perennial memorial fund for 50 or 60 officers and men who are killed every year in the ordinary course of duty?—C. G. G.

## THE AIRSHIPS.

In the House of Commons on Nov. 5, in reply to a question by Mr. Day, the Under-Secretary of State for Air said that the cost of the upkeep of the Airship R.100, including pay and wages of officers and crew, cost of hydrogen and overhead charges, could normally be taken as approximately £600 a week. This was the cost of keeping the airship in flying condition, with running repairs. The present expenditure was considerably less but no definite weekly figure could be quoted. No decision about the use of this particular airship could be made until the report of the Court of Inquiry now investigating the loss of R.101 had been received and considered in all its bearings on future airship policy.

Replying to further questions Mr. Montague said that it was regrettably true that men had lost their employment simply because there was no work for them.

In reply to Mr. Wise he said that copies of the report of the United States Court of Inquiry into the loss of the airship *Shenandoah* were already in possession of the R.101 Court of Inquiry.

In reply to another question by Mr. Wise, Mr. Montague said that the only British airships begun and built since the Armistice were R.100 and R.101 but work had been done after the Armistice on five other airships which were at that time under construction. They were R.33, R.36, R.80, R.38, and R.37. All except the last of these had been completed. The cost of construction of each of the airships had been approximately as follows:—R.33 and R.36 £350,000 each; R.80, £275,000; R.38, £500,000; R.37 (not completed), £325,000; R.100, £350,000 (contract price); R.101 (including insertion of additional bay and other alterations), £640,000.

The two German airships taken over at the Armistice had been dismantled some time after delivery, as they were unsuitable for the Air Ministry programme the total expenditure on them was approximately £1,000. The R.101 Court of Inquiry had already been given particulars of the British airships built before R.100 and R.101 and further information could be supplied to the Court if asked for

Replying to Mr. Malone, Mr. Montague said that the R.100 was at present being deflated and concurrently a full inspection of the hull structure was in progress with minor repair work. Later the cover would be removed. The airship had not yet been formally accepted by the Air Ministry pending the completion of certain repairs made necessary on the trial flight.

No decision as to the further use of R.100 would be taken until after the investigation into the loss of the airship R.101 had been completed. For this purpose the results of the investigation would be taken into consideration, in common with a number of other factors. The amount already paid to the Airship Guarantee Company was £337,000. A further payment of comparatively small amount would become due on satisfactory completion of repairs.

## FRUITS OF DISASTER.

On Nov. 4 Dr. Hugo Eckener told the American Chamber of Commerce in Berlin that work had been suspended on the new airship LZ 128. To the guests at a banquet where he was speaking he said the fate of the R.101 had definitely convinced his company that hydrogen could not be used with a sufficient margin of safety. The airship would be redesigned with a capacity that would allow use of the incombustible but heavier gas, helium, and the work would be delayed a year thereby. Under the circumstances, he said, there was no choice, especially as America had now lifted the export ban on the gas.

Another great change in design, which shows that the German technicians are ready to learn from the experiments as well as the tragedies of others, is the decision to use none but oil-burning engines instead of those which operate on petrol, benzine or *blau gaz*. Thus far the unfortunate R.101 showed the way.

Dr. Eckener said he had argued years ago in America that practical services could not be run without helium, but the ability of airships to stand up to bad weather and yield economic returns was shown by the excellent record of the *Graf Zeppelin*.

According to rumours from Friedrichshafen the size of the new airship will have to be increased from 5,075,000 to 5,600,000 cu. ft. capacity in order to give enough lift with helium instead of hydrogen.

An alternative has been suggested by which auxiliary gas-bags in the top of the airship will hold hydrogen and lower ones helium. This would insulate the hydrogen from all possible source of danger by a very deep layer of helium and also provide for blowing off hydrogen instead of the costlier gas when valving is necessary.

[The question is whether the additional weight of bags for the hydrogen would not absorb most of the saving, and whether hydrogen leaks from the hydrogen bags would not diffuse into the air between the gas bags and the envelope and make an explosive mixture, as it seems to have done in R.101.—C. G. G.]

## THE DEPENDENTS OF THE CREW OF R.101.

In the House of Commons on Nov. 6, in reply to a question by Sir Samuel Hoare, the Under-Secretary of State for Air circulated full information about the amount of pension or gratuity to which each of the dependents of the victims of the R.101 is entitled. He added that excluding the late Secretary of State and his personal servant, the personnel on board R.101 fell into three classes for the purposes of these awards:—

(1) Serving officers and men of the R.A.F.

(2) Civilians who were not workmen within the meaning of the Workmen's Compensation Act.

(3) Civilians who were workmen within the meaning of the Workmen's Compensation Act.

The awards to the dependents of R.A.F. personnel were determined by the King's Regulations and Air Council Instructions.

Awards to the widows and children of the civilians coming under category (2) were made under the Treasury Warrant of Jan. 17, 1919.

The dependants of civilians coming under category (3) were being awarded the compensation to which they were entitled under the Workmen's Compensation Act. Where these awards were of less value than those which might be given under the Treasury Warrant, supplementary awards were being made to make up the difference.

Sir Samuel Hoare asked whether he was to understand that there was no marked discrepancy between the payments, whether gratuities or pensions, to the dependants of the civilian victims and the service victims. Mr. Montague said that there was no marked discrepancy.

[There is no reason whatever why any questions should be asked about the pensions to the relatives of those who died in R.101. They receive, as a matter of routine, precisely the same treatment as the relatives of those who have died either in aeroplane accidents or in the ordinary way of duty in the R.A.F., or in civil employ under the Air Ministry. Thanks are due to Sir Samuel Hoare for having had this made abundantly clear by his question quoted above. There is a great deal too much tendency among Members of Parliament to advertise themselves as philanthropists by asking questions which suggest that they alone are concerned for people who have a claim on the taxpayer's money.—C. G. G.]

## A TRIBUTE TO BEAUVAIS.

According to an unofficial report in *The Times* of Nov. 8 the British Legion decided to send a delegation to Beauvais on Nov. 11. The delegation joined in the celebration of Armistice Day with the people of Beauvais as a tribute to their sympathy with the victims of the disaster to H.M.A. R.101.

## THE GERMAN AIR FORCE.

In the House of Commons on Nov. 3 in reply to a question by Sir F. Hall, the Secretary of State for Foreign Affairs said that he had no official confirmation of the accuracy of a statement which had recently appeared in the Press that arrangements existed between the German and Russian Governments under which a German Force was maintained in Russia to be trained as military airmen. It would be most improper for him to ask the German Government why Captain Amlinger was sent to Russia for that purpose. He would do his best to find out the accuracy of the statement before he acted at all.

[The question is silly. But there is no doubt that Germany wants, and has a moral right to have, an adequate Air Force. Unless she is allowed to build the foundation of such a force within the next year or two we shall regret it deeply, because when the really Great War with Russia comes, our R.A.F. in Germany will have to bear the brunt of the Russian attacks until Germany can train men and build aeroplanes to defend herself.—C. G. G.]

## A PORTUGUESE FLIGHT TO INDIA.

*The Daily Telegraph* for Nov. 8 reports that Capt. Gardosa and Lt. Pimentel, who are flying to Goa, Portuguese India, have reached Cairo from Aboukir. They left again for Gaza.

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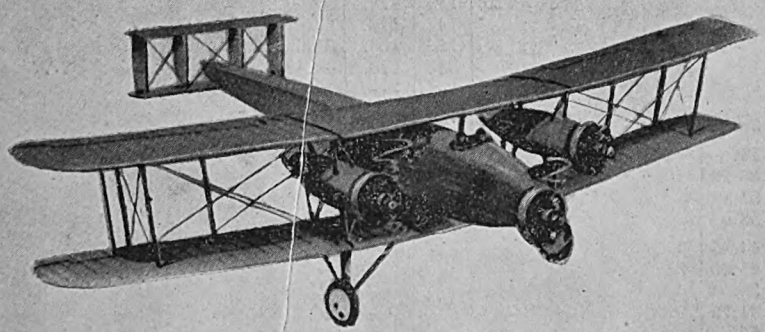

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry November 4.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following are granted Perm. Comns. as Plt. Offs. with effect from Oct. 25 and with seniority of the dates stated:—G. F. Goddard (April 25, 1929); Flg. Off. G. Nelson (R.A.F.O.) (Oct. 25, 1929).

The following are promoted with effect from Nov. 5:—

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—H. M. Massey, M.C., D. H. de Burgh, A.F.C., W. F. Dickson, D.S.O., A.F.C., H. G. W. Lock, D.F.C., A.F.C., A. Rowan, T. C. Luke, M.C., C. E. V. Porter, O. R. Gayford, D.F.C., R. A. George, M.C., K. B. Lloyd, A.F.C., E. R. Openshaw, O. W. de Putron, H. V. Rowley.

FLYING OFFICERS TO BE FLIGHT LIEUTENANTS.—H. C. V. Jolleff, T. N. McEvoy, F. G. H. Ewens, J. A. Hawkings, D. F. W. Atcherley, R. Kellett, A. D. Gillmore, R. C. Wilson, A. J. L. Hughes, C. A. Bell, H. A. Evans-Evans, R. E. Hall, F. S. Hodder, G. P. Chamberlain, J. R. Jones, F. M. V. May, P. E. Berryman, F. W. H. Hall, T. F. Moloney, W. G. Campbell, J. F. Griffiths, C. M. Heard.

The following Plt. Offs. are promoted to the rank of Flg. Off.:—R. H. C. Penney, F. A. Wardell (Oct. 2); E. H. Bellairs, E. L. Brackenbury, L. McHardy, W. R. A. Matheson, D. A. Messiter, L. F. H. Orr (Oct. 13).

Sq. Ldr. (acting Wing Cdr.) J. L. Vachell, M.C., relinquishes the acting rank of Wing Cdr. (unpaid) (Oct. 18); Group Capt. J. R. W. Smyth-Piggott, D.S.O., is restored to full pay from half-pay (Oct. 30); Wing Cdr. D. L. Allen, A.F.C., is placed on the half-pay list, scale A (Nov. 1); Sq. Ldr. T. P. Y. Moore is placed on the half-pay list, scale A (Oct. 30 to Dec. 19); Sq. Ldr. J. S. T. Fall, D.S.O., A.F.C., remains on half-pay, scale B (Nov. 1); Sq. Ldr. A. N. Benge is placed on the retired list at his own request (Aug. 14). (Substituted for the notification in the *Gazette* of Aug. 19.) Flt. Lt. D. S. E. Vines is transferred to the Reserve, Class A (Aug. 15). (Substituted for the notification in the *Gazette* of Aug. 26.) Flt. Lt. D. A. Fletcher (Capt., R.A.R.O.) resigns his S.S. Comn. (Oct. 24).

STORES BRANCH.—Flt. Lt. R. G. Gore is placed on the retired list (Oct. 30); Flg. Off. C. P. Marshall is transferred to the Reserve, Class C (Aug. 10). (Substituted for the notification in the *Gazette* of Aug. 15.)

MEDICAL BRANCH.—M. J. Cahalane, M.B., Ch.B., is granted a Temp. Comn. as a Flt. Lt. with effect from and with seniority of Oct. 3.

DENTAL BRANCH.—F. F. Kennedy, L.D.S., is granted a non-Perm. Comn. as a Flg. Off. with effect from and with seniority of Oct. 15.

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—A. R. Prendergast is granted a Comn. in Class A as a Flt. Lt. (Oct. 24).

The following Plt. Off. of the Special Reserve is promoted to the rank of Flg. Off.:—D. W. Reid (April 8). Flt. Lt. M. Ballard ceases to be employed with the Regular Air Force (Nov. 1); Flg. Off. P. K. Campbell is transferred from Class A to Class C (Mar. 2).

The following Flg. Offs. relinquish their Comns. on completion of service:—L. G. Pinnell (June 10); N. M. Ffrench (Aug. 29); W. J. E. Rodwell (Sept. 2); W. P. Wiltshire (Sept. 2); W. E. Lunnon (Sept. 16). The following relinquish their Comns. on completion of service and are permitted to retain their rank (Oct. 24):—Flt. Lt. E. P. Roberts, M.C., D.F.C., D.C.M.; Flg. Off. G. W. Mahony-Whitton. Flg. Off. G. Nelson relinquishes his Comn. on appointment to a Perm. Comn. in the R.A.F. (Oct. 25).

STORES BRANCH.—The following Flg. Offs. relinquish their Comns. on completion of service:—H. D. Fletcher (Sept. 12); J. C. Daniels (Oct. 1).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—B. S. Thynne (Sept. 30); T. L. E. B. Guinness (Sept. 30). Plt. Off. (Hon. Flg. Off.) P. du Cane is promoted to the rank of Flg. Off. with effect from Oct. 12 and with seniority of Mar. 6.

## Appointments.

*Week ending Nov. 10.*

GENERAL DUTIES BRANCH.—Group Captain J. R. W. Smyth-Pigott, D.S.O., to H.Q., A.D.G.B., Uxbridge, for duty as Chief Staff Officer, 30/10.

Wing Commander D. L. Allen, A.F.C., to Half-pay List, 1/11.

Squadron Leaders T. P. Y. Moore, to Half-pay List, 30/10. L. G. S. Payne, M.C., A.F.C., to H.Q., Coastal Area, 20/10. C. T. Anderson, D.F.C., to Air Ministry (D.O.I.), 27/10. G. D. Nelson, D.S.C., A.F.C., to R.A.F. Depot, Uxbridge.

Flight Lieutenants R. L. R. Atcherley, to No. 14 Sqdn., Amman, 13/10. G. T. H. Pack, to School of T.T. (Men), Manston, 12/11. R. E. M. B. Milne, to R.A.F. Depot, Uxbridge, 27/10. A. W. Bates, to No. 23 Group H.Q., Grantham, 1/11. A. H. J. Howlett, to No. 100 Sqdn., Donibristle, 27/10. A. P. K. Hattersley, to R.A.F. Depot, Uxbridge, 12/10. G. Lansdowne, D.F.C., to R.A.F. Depot, Uxbridge, 3/11.

Flying Officers W. Gill, to No. 1 School of T.T. (Apprentices), Halton, 20/10. F. Gower-Jones, to No. 15 Sqdn., Martlesham Heath, 27/10. P. G. J. Atkinson, to Station Administration, Halton, 29/10.

Pilot Officers G. F. Goddard and G. Nelson, to No. 3 F.T.S., Grantham, on appointment to perm. comm., 25/10. K. R. Warton, to No. 3 F.T.S., Grantham, on appointment to a s.s. comn., 28/10. N. R. G. Hunter, to No. 58 Sqdn., Worthy Down, 30/10.

MEDICAL BRANCH.—Wing Commander B. A. Playne, D.S.O., to Central Medical Establishment, for duty as President of the Medical Board, 10/11.

Flight Lieutenants E. C. K. H. Foreman, to H.Q., R.A.F., Mediterranean, 29/10. J. J. Quinlan, to Station H.Q., Upavon, 16/11. R. F. MacLatchy, to Station H.Q., Boscombe Down, 1/11.

STORES BRANCH.—Flight Lieutenants W. B. Frederick, to No. 1 Air Defence Group H.Q., 30/10. E. C. Farman, to Station H.Q., Donibristle, 3/11. R. T. Rich, to School of Photography, S. Farnborough, 16/11. A. H. Comfort, to R.A.F. Depot, Uxbridge, 7/10.

Flying Officer F. R. Lines, to R.A.F. Record Office, Ruislip, 1/11.

ACCOUNTANT BRANCH.—Flight Lieutenant B. L. Blofield, to A. and A.E.E., Martlesham Heath, 24/10. R. W. L. Glenn, to Station H.Q., Boscombe Down, 4/11.

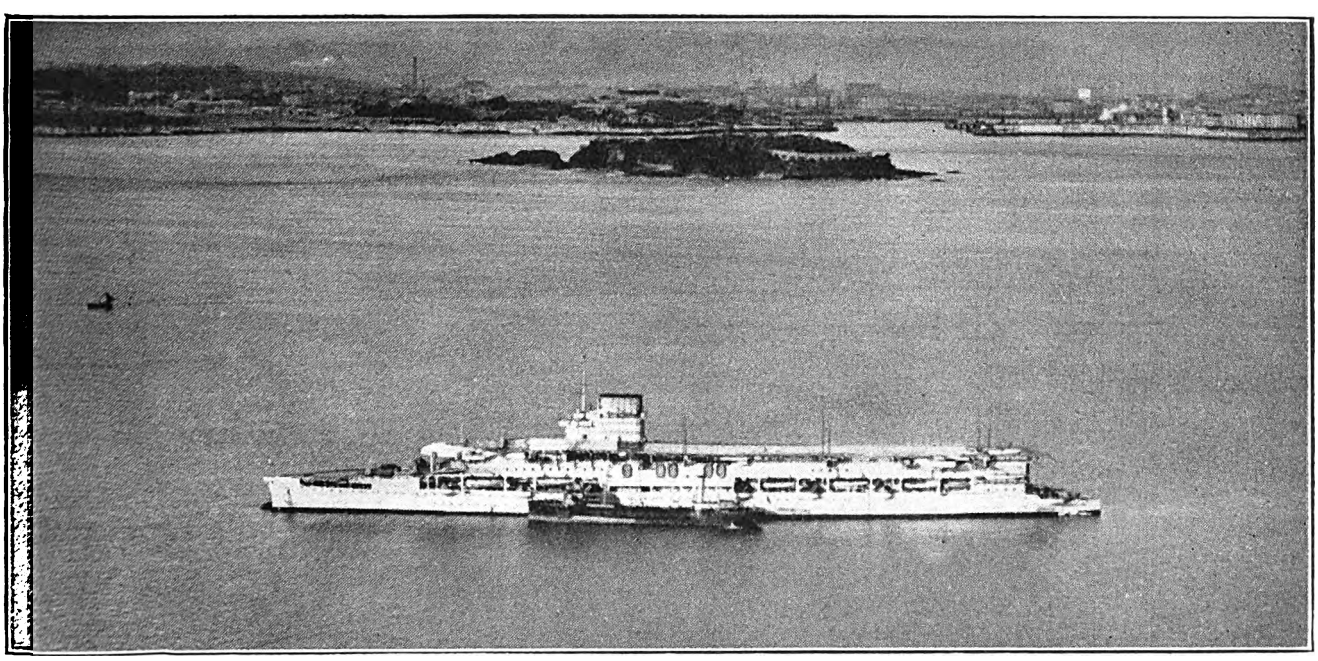
Flying Officers R. A. J. Mullarkey, to No. 26 Sqdn., Catterick, 3/10. J. P. Cave, to No. 2 Armoured Car Coy., Ramleh, 20/10.

CHAPLAINS' BRANCH.—The Revd. G. H. Piercy, M.A., to H.Q., 'Iraq Command, Hinaidi, 15/10.

## Fatal Accidents.

The Air Ministry regrets to announce that as the result of an accident at Manston, Kent, to a Virginia machine of No. 9 (Bomber) Squadron, Manston, on Nov. 4, Flg. Off. Frederick Robert Walter Goad, the first pilot of the aircraft, and No. 356992, Sjt. George William Roberts, the second pilot, were killed. No. 366280, AC.1 Alan William Edwards, the other member of the crew, was slightly injured.

The Air Ministry regrets to announce that as the result



**FAIR HARBOUR.—H.M.S. "Glorious," the latest British aircraft carrier, in harbour at Malta.**

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of an accident at Ingatestone, Essex, to a Siskin machine of No. 56 (Fighter) Squadron, North Weald, on Nov. 4, Flg. Off. Max Ian Barnett, the pilot and sole occupant of the aircraft, was killed.

**Armistice Day.**

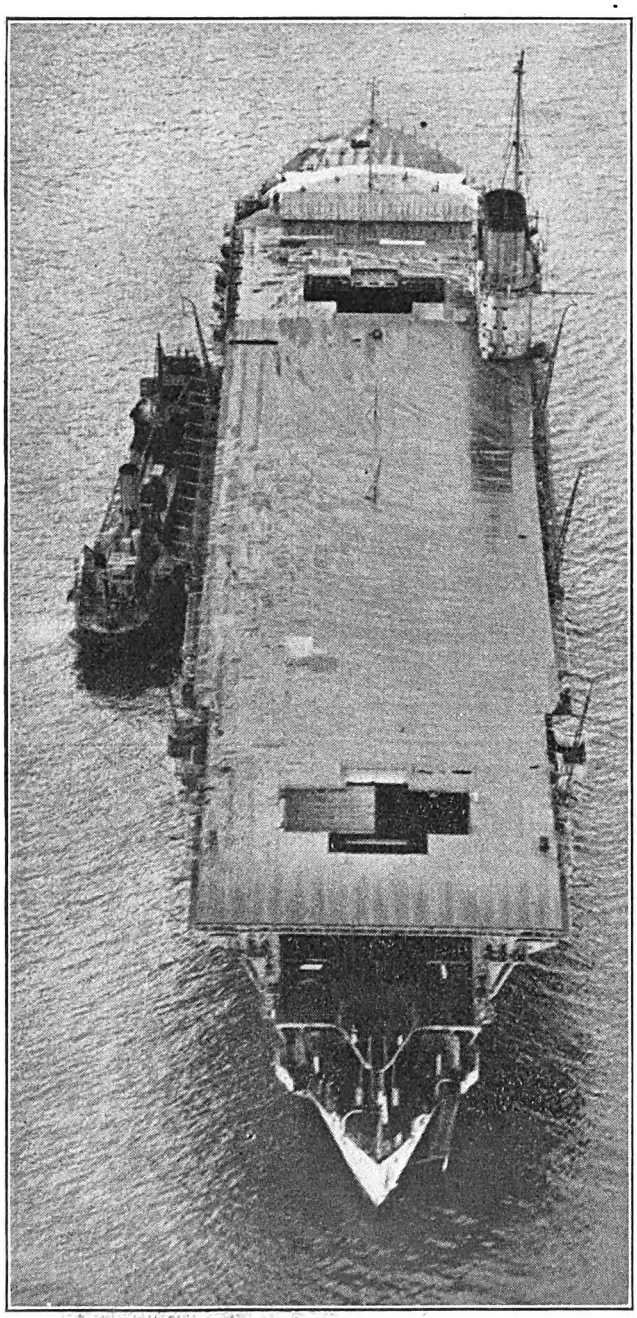
A detachment of the Royal Air Force formed part of the Guard of Honour mounted at the Cenotaph, Whitehall, on the occasion of the Armistice Day Ceremony on Nov. 11. Trumpeters of the R.A.F. sounded the "Last Post."

A wreath was laid on the Cenotaph by Air Chief Marshal Sir John Salmond, Chief of the Air Staff, on behalf of the Royal Air Force.

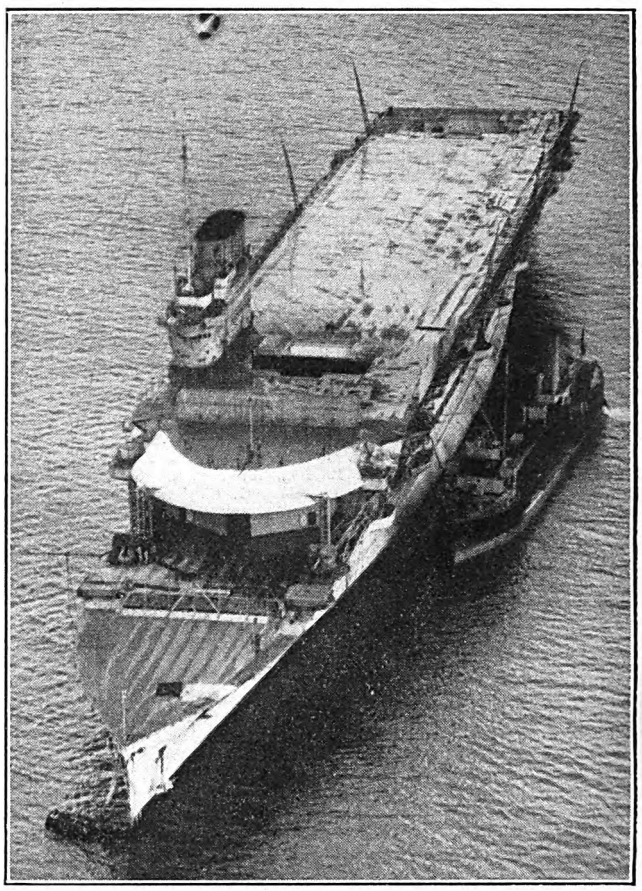
The ex-Service contingent included a detachment of the Women's Royal Air Force, and a wreath was laid at the foot of the Cenotaph by a representative of the W.R.A.F. Old Comrades' Association.

**The R.A.F. Memorial.**

A short ceremony was held at the R.A.F. Memorial on the Embankment at midday on November 9, the Sunday before Armistice Day. Air Chief Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O., who was accompanied by members of his Staff and a number of senior officers of the Royal Air Force laid a wreath on the Memorial on behalf of the Royal Air Force and of the Committee of the R.A.F. Memorial Fund. Members of the Committee of the Fund were also present.



THE FLYING DECK.—A bird's-eye view of H.M.S. "Glorious," looking forward. The lifts by which the aeroplanes are brought up to the flying-deck can be seen.



**THE UGLY DUCKLING.—H.M.S. "Glorious,"—viewed from above the port bow.**

Wreaths were also laid on the Memorial by the Canadian Liaison Officer on behalf of the Royal Canadian Air Force and the people of Canada, and by the New Zealand Liaison Officer on behalf of the New Zealand Air Force and the people of New Zealand. The Australian Liaison Officer was also present.

A wreath was also laid on the Memorial by a representative of the Women's Royal Air Force Old Comrades' Association on behalf of the Association.

Monsieur Brunat and Monsieur Juglard, of the Service Technique of the French Air Ministry, placed a wreath at the special request of Monsieur Laurent Eynac, the French Air Minister, on the R.A.F. Memorial on Oct. 7, as a tribute to Lord Thomson and all members of the crew of the R.101 who lost their lives at Beauvais.

Air Commodore Holt, representing the Air Council, received MM. Brunat and Juglard at the Memorial, and Lieutenant de Vaisseau Sala, the French Air Attaché in London, was also present.

**An Act of Remembrance.**

A Service of Thanksgiving and Memorial for those Killed in Action or Died of Wounds or Sickness during the Great War was held at the Church of St. Michael and All Angels, Cranwell, on November 9. This Church was originally a large aeroplane shed and has been transformed into a beautiful church by the personnel serving at Cranwell. Most of the material used was taken from disused aircraft parts. The lights are mounted on four-bladed airscrews, the font is made from the cowling of an engine, and practically all the furnishing of the church is eloquent of the painstaking industry of all ranks concerned with the work.

The Service was conducted by Sq. Ldr. the Rev. J. A. Jagoe, assisted by Sq. Ldr. the Rev. M. K. MacLeod, and Sq. Ldr. the Rev. A. R. A. Watson. A simple and impressive sermon was preached by the Bishop of Lincoln.

Air Vice-Marshal A. M. Longmore, Air Officer Commanding R.A.F. Cranwell, and Mrs. Longmore, Wing Commander C. S. Evill, Assistant Commandant, R.A.F. College, and Mrs. Evill, Group Capt. A. L. Godman, Commandant of the Electrical and Wireless School, and Mrs. Godman, and over a thousand officers, non-commissioned officers, airmen and aircraft apprentices attended the Service.

Among the distinguished visitors were the Lord Trenchard and Lady Trenchard, and the three former Commandants of the R.A.F. College, Air Vice-Marshal C. A. H. Longcroft, Air Vice-Marshal F. C. Halahan, and Air Vice-Marshal A. E. Borton.

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After the Service all the Units on Parade marched past the Saluting Base, which was unoccupied, and saluted the Flag which was flying at half mast in memory of the Illustrious Dead.

### Warships and Aircraft.

In the House of Commons on Nov. 5 in reply to a question by Major Ross, the First Lord of the Admiralty said that twenty-one ships of the British Navy other than aircraft carriers were equipped with flying-off facilities for aircraft. Of these five were equipped with catapults and sixteen with flying-off platforms for light aircraft. The latter were regarded as obsolescent and steps were being taken to increase the number of ships fitted with catapults.

Thirty-three United States warships were fitted with catapults suitable for launching aircraft, namely eighteen battleships, three of which would be scrapped under the London Treaty, and fifteen cruisers.

### Service Aircraft in India.

In the House of Commons on Nov. 3, in reply to a question by Mr. Day, the Secretary of State for India said that the number of squadrons equipped with general purpose aircraft at present in India was four, all of which were at present in the North West Frontier Province.

### The West African Flight.

The R.A.F. West African Flight of three Fairey IIIF's (Napier engine) of No. 47 (Bomber) Squadron, started on its return journey from Bathurst, on Nov. 10, and reached Bamako at dusk the same day.

### The Halton Camp Milk Supply.

In the House of Commons on Nov. 5, in reply to Mr. de Rothschild and Brigadier-General Clifton-Brown, the Under-Secretary of State for Air said that milk was not an item of the public ration scale for the R.A.F. at Home, but with some other articles of diet, was purchased locally by the airmen themselves out of a daily cash allowance. The Airmen's messing committee were free to decide upon the type of milk to be purchased and at Halton they had decided to use emulsified milk made on the station by their own emulsifier. The ingredients at present used were Canadian milk powder and New Zealand fresh butter. The product satisfied the R.A.F. medical authorities and he did not propose to interfere in what was considered to be a domestic matter of the unit.

Mr. Beaumont suggested that the reason for the change was the inordinate profits made out of fresh milk by the Navy, Army and Air Force Institute and Mr. Montague replied that he was not aware of the truth of that statement, and would like to point out that this rule for local option, as it were, was a very old-established one in the Army as well as in the Air Force. Mr. Beaumont claimed that the unit was compelled to buy through the Institute and the question of their profits prevented the milk from being bought locally. Mr. Montague said that he was not aware of these points but he would look into the matter.

### The Bombing Range in Berkshire.

In the House of Commons on Nov. 5, in reply to a question by Major Glyn, the Under-Secretary of State for Air said that the Air Ministry did not now propose to proceed with the purchase of land on the Berkshire Downs in the vicinity of the White Horse Hill.

### Foreign Officers with the R.A.F.

Two officers of the Japanese Military Air Service are attached to the R.A.F. Station, Tangmere, from Nov. 6 to Nov. 19 inclusive for the purpose of studying the work of single-seater fighter Squadrons.

The names of the officers are Captain Aoki and Captain Suganami.

### The R.A.F. Inter-Unit Rugby Cup.

The draw for the R.A.F. Rugby Football Inter-Unit Challenge Cup Competition has now been made and is published as an appendix to Air Ministry Weekly Orders.

Weather conditions and the exigencies of the service permitting, matches are to be played on the dates specified. Where R.A.F. duty will not permit of play on the date specified, application should be made, as early as possible, to the Hon. Sec., R.A.F. Rugby Union, Inter-Unit Cup Competition, Room 644, Air Ministry, Kingsway, London, W.C.2, for a fresh date to be allotted.

Results of matches should be forwarded by the secretary of the home team as soon as possible to:—The Hon. Sec., R.A.F. Rugby Union Inter-Unit Cup Competition, at the above address.

The services of the R.A.F. Rugby Union official referees should be utilised in these matches where possible. Application for the services of these officials should be made to:—Sq. Ldr. A. W. Turner, D.C.M., No. 4 Stores Depôt, R.A.F., Ruislip, Middlesex.

The first round must be played on Dec. 3, the second round on Jan. 21, the third round on March 4, the semi-finals on March 18, and the final on April 1.

### Rugby Football.

The Royal Air Force College, Cranwell, has its collective tail well up.

On Nov. 8 the College Rugby Football Team defeated the Royal Military College, Sandhurst, by four tries (12 points) to a goal and a try (8 points). The match was played at Cranwell under perfect weather conditions and in the presence of the Chief of the Air Staff and a large number of distinguished Air Force officers, past and present Cadets and all the available personnel of the Cranwell Station, not to mention the feminine relatives whose applause, if less raucous, was no less enthusiastic.

A gasp of horror went through the spectators when the Sandhurst team, mostly consisting of giants, came onto the field followed by the rather light-weight Cranwell team, and there was a muttered undertone of calculations of the respective weights of the scrum. There was, in fact, a difference of over a stone per man in the scrum. However, the match turned out to be a triumph of tactics and fitness over sheer strength.

Cranwell scored in the first five minutes. Rhys whipped the ball away from a scrum and Elsner dashed through on the right wing. The goal-kick failed. A stiff fight in mid-field lasted for a few minutes and Sandhurst gradually fought their way into the Cranwell half. Keen tackling by the Cranwell backs held them for a time, but twenty minutes from the start a combined movement on the Sandhurst right wing gave them a try near the flag. The try was converted by a fine kick, the ball hitting the cross-bar and falling inside. In spite of desperate Cranwell defence Sandhurst scored again on the right wing a few minutes later. This was not converted.

Both teams then settled down to a steadier game and Cranwell began to play some of the best Rugger that one has ever seen. Not content with their superior weight Sandhurst adopted wheeling tactics in the scrum for which Cranwell were quite ready. Good heeling and hooking and smart work at the base of the scrum outplayed the Sandhurst forwards and the Cranwell backs were constantly on the move. Even when Sandhurst did get the ball they were smothered in the centre, and the fast Sandhurst wings rarely got on the move. Just before half-time a bout of clean passing among the Cranwell backs and a burst of speed with a couple of good hand-offs by Doran brought Cranwell their second try. This was right in the corner and was unconverted.

Immediately after the restart Cranwell scored a particularly smart try from a line-out,—Rhys, who was playing an excellent game at scrum half, actually crossed the line. Again no goal. Cranwell can hardly be blamed for the loss of the extra points from goal kicks because each one was from a very difficult angle.

The Sandhurst team, which looked by no means doomed at this stage, worked its way slowly but surely back to Cranwell territory but was driven back by a magnificent kick to touch by Chesterman, the Cranwell full-back. Chesterman played a cool, steady game throughout and kicked a good length, although he did not always find touch.

A great attack by Cranwell was foiled almost on the Sandhurst line, and Sandhurst followed up with a forward rush which took them nearly over the Cranwell line. The Cranwell defence was too good for them and they were driven back to mid-field. A dangerously long punt ahead by Cranwell was followed up so quickly that the man with the ball was tackled before he could kick, and Cranwell were well on top again. During the last few minutes the Cranwell team showed what real fitness can do and in spite of every effort by Sandhurst, Cranwell scored another try before the end.

Where a match has been won by real team work one hardly likes to single out individual players, but notable among the forwards was Daubeny, and among the backs, Doran and Elsner. Special congratulations are accorded to Coslett, the Captain, whose twenty-first birthday was celebrated by this great win.

The teams were:—

*Cranwell.—Full back*: Flt. Cadet Chesterman. *Three-quarters*: Flt. Cadets Parselle, Leigh, Windsor, and Doran. *Halves*: Flt. Cadets Rhys and Elsner. *Forwards*: Flt. Cadets Reed, Addenbrooke, Daubeny, McNair, Empson, Collyns, Coslett and Oliver.

*Sandhurst.—Full back*: Cadet Arbuckle. *Three-quarters*: Cadets Cowey, Monro, Moran, and Wellwood. *Halves*: Cadets Knight and Tailyour. *Forwards*: Cadets Watts, Offord, Laslett, Pritchard, Keen, Heathcote, Watson, and Venning.—C. M. MCA.

### The Wakefield Boxing Championships.

The Novices' Competitions were held at Henlow on Nov. 6 and 7. Lord Wakefield was, unfortunately, unable to be present, but the distinguished visitors included Major-General Sir Percy Cox (late High Commissioner for 'Iraq), Air Marshal Sir Edward Ellington, Air Vice-Marshal A. E. Borton, and Air Vice-Marshal C. A. H. Longcroft. A hundred bouts were fought off on Wednesday to sift out the finalists and interest was maintained throughout the competition by the close race for Team points.

The officers' contests produced a clever fighter in Plt. Off. Heygate of Sealand. Though dwarfed by his opponents and greatly at a disadvantage for reach, Heygate bored his way in to knock out Plt. Off. Mermager (Digby) in the semi-final and only the intervention of the referee saved Plt. Off. Foster (Netheravon) in the final.

There was an unfortunate disqualification in the Junior Heavy-weights when AC. Layley of Gosport fouled Sjt. Coote of Upavon in the 2nd round. Coote had scored two first round knock-outs to get into the final, but Layley proved to be a formidable opponent, and was more than holding

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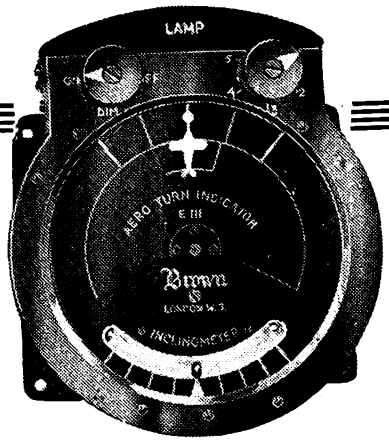


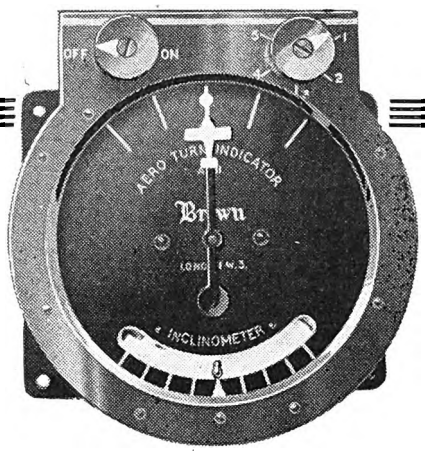


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**(Left.)**

A scientifically-made precision instrument. Its weight is only 1 lb. 7 ozs., and its size is 4 ins. cube. The electric model consumes only ·5 ampere at 12 volts, and has no effect whatever on the magnetic compass. A striking example of British workmanship.

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**AIR-DRIVEN MODEL**
**(Right.)**

The Air-driven Brown Aero Turn Indicator is identical in weight (1 lb. 7 ozs.) and size (4 in. cube) to the electric model. "On-and-off" control for air supply enables instrument to be started and stopped in the air.

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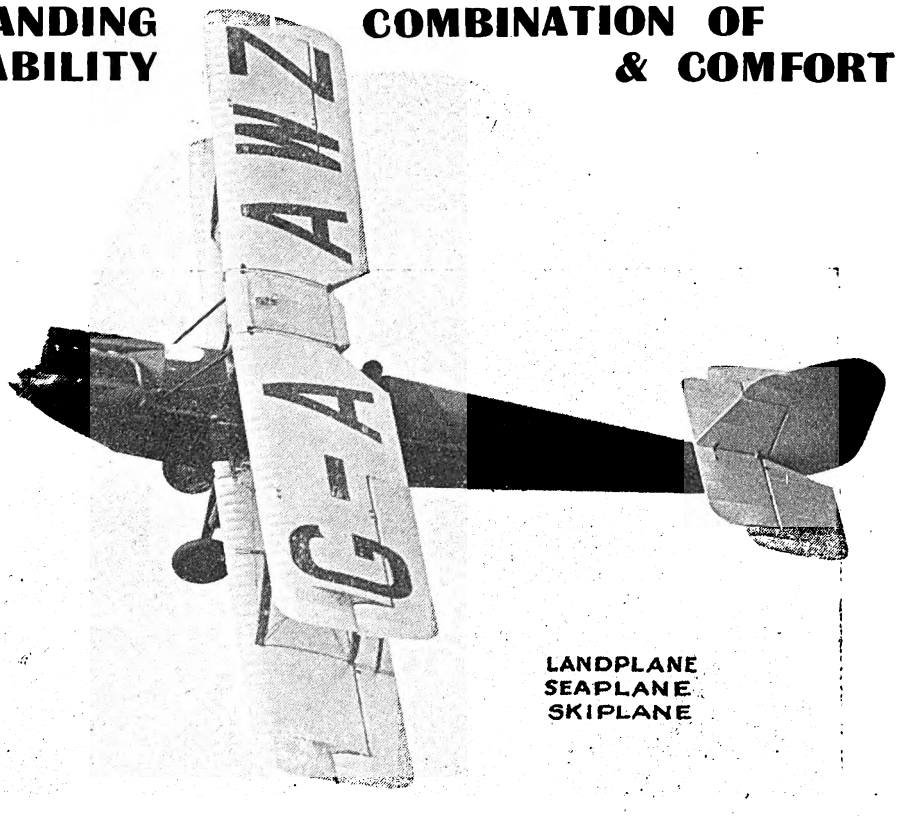
**Comfort of pilot and passenger has been catered for in the design of the "Arrow." The cockpits are free from draughts and provided with large doors. The range of view is a remarkable feature, and represents an improvement on anything hitherto obtained with this type of two-seater.**

**A feature making for ease of control are the large and well-balanced control surfaces. As a result the control is positive right up to the stall, to a degree which astonishes experienced pilots.**

**The machine has been designed to take a Gipsy II, Cirrus-Hermes, Gipsy I, or Cirrus Mark III engine, thus furnishing the prospective owner with a wide field of choice.**

**The normal certificate of Airworthiness has been granted for the high figure of 1750 lbs., and the aerobatic certificate has been granted for a total weight of 1560 lbs. The former figure allows a generous margin of safety even with pilot, passenger and heavy luggage.**

**Full details of the performance in the two categories with various engines are available on request.**

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# THE SPARTAN ARROW

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his own at the time of disqualification. The occurrence was the more unfortunate by reason of the fact that the low blow was obviously unintentional.

The Junior Middle-weights was won by AC. Heirene (Larkhill), a terrific fighter of much promise. In disposing of AC. Edwards (Gosport) by a knock-out in the 2nd round he beat an opponent of more than average ability.

Two lads are specially deserving of commendation for displays of indomitable courage—AC. Fisher (Eastchurch) who stood up to a terrific battering from Heirene, and AC. Eves (Digby) who was beaten by AC. Reynolds (Gosport), the referee intervening in both cases during the last round.

Details of the final bouts are as follows:—

*Junior Fly-weight*: AC. McPherson (Digby) beat AC. Buglehole (Gosport).

*Junior Bantam-weight*: AC. Butterworth (Digby) knocked out 1st Round AC. Gordon (Gosport).

*Junior Feather-weight*: AC. Cannel (Worthy Down) beat Sjt. Little (Upavon).

*Junior Light-weight*: L-AC. Reynolds (Gosport) beat AC. Eves (Digby), Referee intervening 3rd Round.

*Junior Welter-weight*: AC. Turner (Digby) beat L-AC. Oliver (Shrewsbury).

*Junior Middle-weight*: AC. Heirene (Larkhill) knocked out 2nd Round AC. Edwards (Gosport).

*Junior Light-Heavy-weight*: AC. Cox (Duxford) beat AC. Keiran (Shrewsbury).

*Junior Heavy-weight*: Sjt. Coote (Upavon) beat AC. Layley (Gosport). (Disqualified 2nd Round.)

*Officers' Feather-weight*: Plt. Off. Littler (Netheravon) beat Plt. Off. Shelton (Sealand).

*Officers' Light-weight*: Plt. Off. Holland (Digby) beat Plt. Off. Hankins (Netheravon).

*Officers' Welter-weight*: Plt. Off. Nixon (Sealand) beat Plt. Off. Watson (Netheravon).

*Officers' Middle-weight*: Plt. Off. Heygate (Sealand) beat Plt. Off. Foster (Netheravon). Referee intervened in 3rd Round.

*Officers' Light-Heavy-weight*: Flg. Off. Bamber (Digby) knocked out in 3rd Round Flg. Off. Murray (Felixstowe).

*Officers' Heavy-weight*: Plt. Off. McAuley (Sealand) knocked out in 1st Round Plt. Off. Morris (Digby).

*Senior Fly-weight*: AC. James (Halton "B") knocked out in 1st Round AC. Bent (Uxbridge).

*Senior Bantam-weight*: AC. Davis (Cranwell beat AC. Cameron (Henlow).

*Senior Feather-weight*: AC. Edwards (Uxbridge) beat AC. Bonney (Halton "B").

*Senior Light-weight*: AC. Crawford (Henlow) beat AC. Irving (Uxbridge).

*Senior Welter-weight*: AC. Holland (Uxbridge) beat AC. Hall (Halton "B").

*Senior Middle-weight*: AC. Storey (Cranwell) knocked out in 1st Round AC. May (Halton "B").

*Senior Light-Heavy-weight*: AC. Simmonds (Henlow) knocked out in 1st Round AC. Hatfield (Cranwell).

*Senior Heavy-weight*: AC. Prior (Uxbridge) knocked out in 1st Round AC. Hall (Manston).

The final team placings for the Trophies were as follows:—

*Officers*: Sealand 17, Netheravon 13, Digby 12.

*Airmen Senior (Open)*: Uxbridge 33, Henlow 29, Cranwell 28.

*Airmen Junior*: Gosport 43, Digby 39, Shrewsbury 31.

In introducing Sir Percy Cox for the presentation of the trophies Air Vice-Marshal Borton congratulated Group Captain Bettington, O.C. R.A.F., Henlow, and Sq. Ldr. Pettingell, the Secretary of the R.A.F. Boxing Association, on the excellent organisation in connection with the competitions. He also expressed the pleasure of the assembled company at the attendance of Air Vice-Marshal Longcroft, a past President of the R.A.F. Boxing Association, whose work in the cause of R.A.F. boxing was largely responsible for its high standard.

Sir Percy Cox, in a brief address, said that all England should be grateful to Lord Wakefield for the support given by him to every sporting enterprise and competition in the interests of this country. He also made a sympathetic reference to the officers and crew of the R.101, many of whom were present at last year's contests, by whose deaths the Air Force had lost so many friends and comrades.—C. H. H.

### AN APPOINTMENT.

The Air Ministry announces that the Rt. Hon. Lord Amulree, G.B.E., K.C., Secretary of State for Air, has appointed Mr. J. R. Oldfield, M.P., to be his Parliamentary Private Secretary.

Mr. Oldfield is Labour Member for the South Eastern Division of Essex. He was educated at Eton and Trinity College, Cambridge, where he took an Honours degree in History. He has been associated with educational and social work.

### AIR COMMODORE KINGSFORD SMITH.

Wing Commander C. E. Kingsford Smith has been promoted to the honorary rank of Air Commodore in the Royal Australian Air Force.

Air Commodore is the rank of the Chief of the Air Staff of the Royal Australian Air Force and is the highest existing rank in that Service.

### THE CHIEF JUSTICE OF SARAWAK.

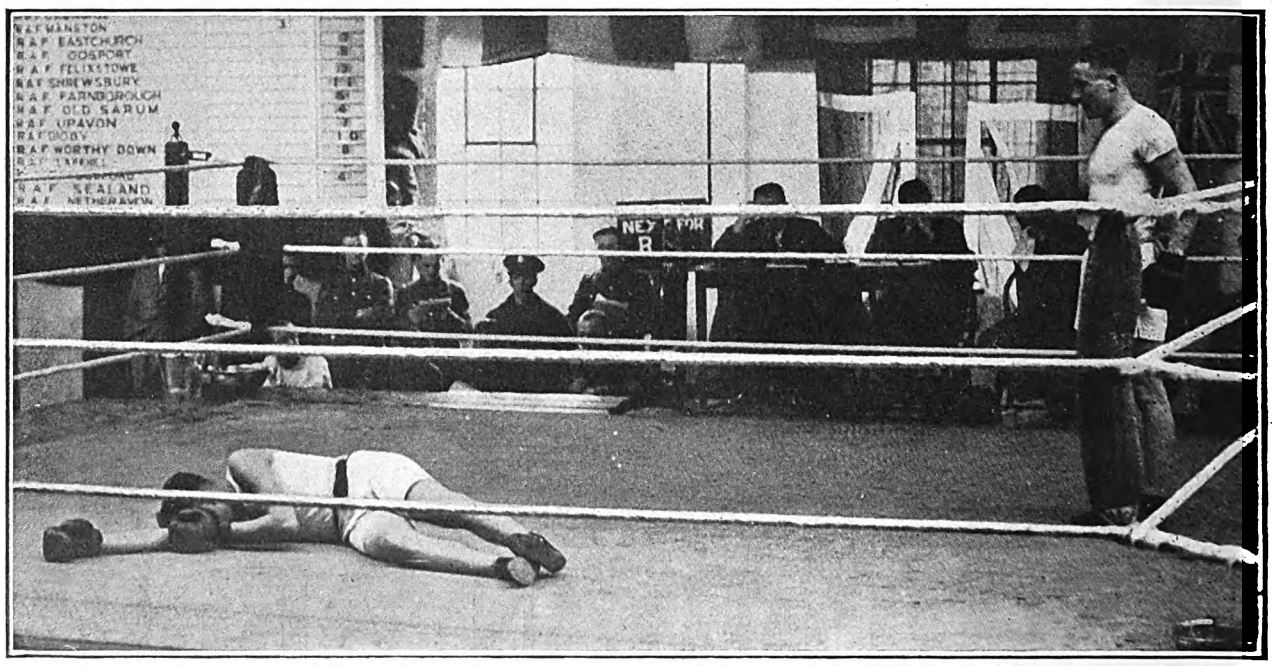
According to *The Times* His Highness the Rajah of Sarawak has appointed Mr. T. Stirling Boyd, Judicial Commissioner and Judge of the Supreme Court of Sarawak, to be Chief Justice of Sarawak.

Mr. Stirling Boyd was educated at the Edinburgh Academy and Trinity College, Oxford, and served in England and France, in the Royal Naval Volunteer Reserve, and the Royal Air Force during the War. In 1919 he was attached to the Staff of Sir John Salmond at Headquarters, R.A.F., in France, and on demobilization he was appointed to a civil position in the Air Ministry.

He was called to the Bar by the Inner Temple in 1919, and in 1928 he was appointed Judicial Commissioner of Sarawak, which was the first appointment in Sarawak of a professionally-trained Judge. He is 44 years of age.

### "AEROPLANE" POSTCARDS.

A second set of six postcard photographs of modern British aircraft is now available and includes the Fairey Fox, the Fairey Firefly, the Hawker Fury, the De Havilland Intercepter, the Gloster Gnatsnapper and the Blackburn Ripon. Applications for this set should be made to the Photographic Dept., The Aeroplane, 175, Piccadilly, W.1, and marked Set "B." The price is 2s. post free.




**THE VERDICT.—On the right Sjt. Coote (Upavon), the winner of the Airmen's Junior Heavyweights in the Wakefield Novices' Championship. On the left is AC. Hailstone (Larkhill), Sjt. Coote's first victim.**

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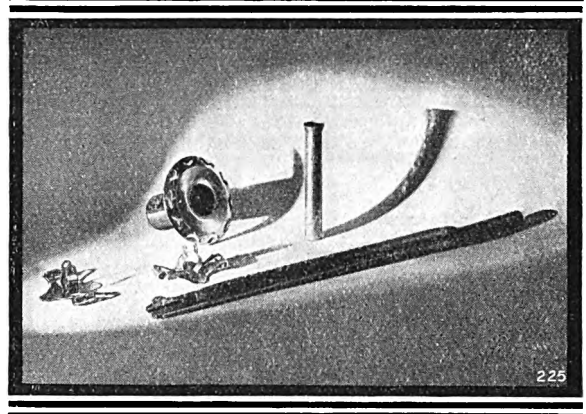


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Cold rolled strip for deep stamping and press work, and strip steel, notably D.T.D.57, for the deepest stamping, are available in mild steels, high carbon spring steels, and special non-rusting steels, in a wide variety of widths and thicknesses.

We have the newest plant in the country for continuously heat treated aircraft strip and wire.

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## GUARANTEED USED AIRCRAFT.

Ref. No. 50. Metal Avian. Hermes II. 115 h.p. 150 hours. Slots and Compass. 5 months C. of A. ... ... ... ... ... £695

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**A unique feature of Henlys' organisation at Heston is a fleet of six- and eight-cylinder "drive yourself" hire cars, which are available at moderate charges.**

**"MACHINE PERFECT. CONSIDER AVRO AVIAN BEST LIGHT AEROPLANE IN THE WORLD."**

Need one say more . . . except that you can buy a similar machine for only **£875.** Other Avian prices are as follows:—

Mark IV. with Cirrus II. engine and full standard equipment. 85 h.p. ... ... £575
Mark IV. with Cirrus III. engine. 95 h.p. ... £595
Mark IV. M metal fuselage. Hermes II. engine. 115 h.p. ... ... ... £795
Mark IV. M Sports Model. Hermes II. engine. 115 h.p. ... ... ... £825
Mark IV. Sports Gipsy II. 120 h p ... £875

**AVIAN CONCESSIONAIRES FOR THE UNITED KINGDOM:**

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**Devonshire House, Piccadilly, W.1., Hangars, Machines & Experts at Heston Aerodrome. Middlesex. Tel : Hayes 410**

**FREE DEMONSTRATIONS ANYWHERE; DISTANCE NO OBJECT. . . . . FOREIGN ENQUIRIES INVITED. DEFERRED PAYMENT TERMS AVAILABLE ON BOTH NEW AND USED MODELS**

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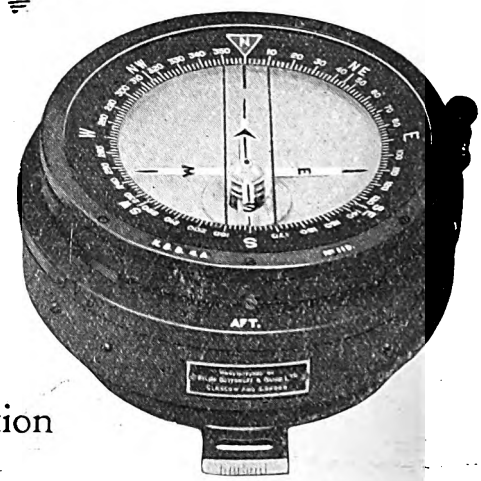

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*i.e.* If the Magnet - System be deflected to any angle and be then released it overswings the position of equilibrium once only by a few degrees and then promptly returns to its position of rest.

Extremely **Quick & Dead-Beat** in Action

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**Made in two sizes for Solo Flying and for Passenger 'Planes.**

Approved by Air Ministry for Civil Aviation

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**KELVIN, BOTTOMLEY & BAIRD, LTD.,**
**18, Cambridge Street, Glasgow.**
**Imperial House, 11-15, Air Street, Regent Street, London, W.1.**




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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### THE MAN WHO FLEW HOME.

As reported in THE AEROPLANE of Nov. 5, Mr. Oscar Garden reached Wyndham on the North Coast of Australia on the afternoon of Nov. 4. He left Lympne 18 days earlier. Although this time does not compare with Wing Cdr. (now Air Commodore) Kingford Smith's express journey of under ten days, one must remember that one does not usually compare the performances of the average sporting driver with those of Birkin or Carraciola.

Mr. Oscar Garden, who comes from Sutherlandshire, has been in business in Australia and New Zealand for the last eleven years. He recently came back to England on holiday and became interested in Aviation. He bought an aeroplane and bought it over the counter, in a manner of speaking.

He went to Selfridge's and bought a second-hand D.H. Gipsy Moth, and gave his car in part exchange. This is well worth noting.

He learned to fly at Norwich and after he had put in some twenty hours' flying-time decided to fly back.

He left Lympne Aerodrome on Oct. 17, and as will be seen from the following schedule, made such good progress that on reaching Calcutta he was only one day behind Mr. Bert Hinkler's time, namely, eleven days against Mr. Hinkler's ten. The day was lost through being held up at Constantinople because of what appear to be the usual difficulties with permits covering landing in Turkey, although Mr. Garden had the necessary documents.

His time-table was as follows:—

Oct. 17, Lympne—Oct. 17, Munich (1st day); Oct. 18, Belgrade (2nd day); Oct. 19, Constantinople (3rd day); Oct. 22, Aleppo (5th day); Oct. 23, Baghdad (6th day); Oct. 24, Bushire (7th day); Oct. 25 Jask (8th day); Oct. 26, Karachi (9th day); Oct. 27, Allahabad (10th day); Oct. 28, Calcutta (11th day); Oct. 30, Rangoon (13th day); Oct. 31 Singora (14th day); Nov. 1, Singapore (15th day); Nov. 2, Batavia (16th day); Nov. 3, Sourabaya (17th day); Nov. 3 Bima (17th day); Nov. 4, Kupang (18th day); Nov. 4, Wyndham (5 p.m.) (18th day).

On Nov. 5 he flew from Wyndham to Alice Springs. On Nov. 6 he arrived at Broken Hill and landed at Sydney on Nov. 7. Twenty-one days' aerial touring between Lympne and Sydney seems pretty good going for the private owner.

Flights of this sort are of definite value as showing the advantages of the light aeroplane for saving time on really long journeys.

On the other hand, private owners, potential and actual, must remember that absolutely regular functioning of the engine is essential when flying over countries that do not offer much in the way of a forced landing ground. One must have as well instruments whose reliability and accuracy is unchallenged. For such reasons, we suppose, Mr. Garden had his engine lubricated with Mobiloil, used K.L.G. sparking plugs, relied on Smith's Aircraft Instruments and navigated with a Husun aperiodic compass.

### FOR FUTURE REFERENCE.

As Miss Delphine Reynolds has received a certain amount of publicity in the daily press already THE AEROPLANE would like to take its readers into its confidence and tell them something of what it knows.

Colonel Sir James Reynolds, who is Member of Parliament for the Exchange Division of Liverpool, has bought his daughter a special machine with which she is to fly to South Africa with Mr. R. B. Waters as navigator-pilot.

This machine, which is now being specially built, is a Blackburn Bluebird with an 120 h.p. inverted Gipsy III engine. It will have a float undercarriage and the fuel will be carried in the floats. With the new engine the Bluebird has quite an astonishing performance, and, seeing what The Master of Sempill, and Sq. Ldr. Slatter have done in the way of long voyages in Bluebirds, and how well a whole flock of them behaved in the King's Cup Race, and how far Mrs. Bruce has mysteriously progressed towards Japan, there is quite a sporting chance that this flight to the Cape by the West Coast—which is a route which one personally regards as of the utmost importance to the British Empire—may succeed. And if it does that excellent sportsman Mr. Waters will deserve full credit for it.

The flight is timed to start from Southampton early in the New Year, but it may begin earlier if the weather is right.

### THE NORTHAMPTON CLUB DANCE.

One of the jolliest dances ever held in Northampton, and easily the most successful arranged by the Aero Club, was held at the Salon on Friday, Nov. 7.

Nearly 350 tickets were sold, and though it was a difficult task to get all the tables fitted in, yet everything was satisfactorily arranged and there was no overcrowding anywhere.

There has been much *talk* for a long time about a Dress Reform for men, so the Flying Committee decided it was about time they took the matter in hand and *did* something. About twenty of the more venturesome members of the Aero Club wore original costumes. With black dress-trousers they wore black shirts, white bow-ties, white links and studs, and broad white scarves round their waists.

Naturally much criticism was aroused, a good deal of it adverse. However, the sight of a group of "Dress Reformers" walking down the ball-room floor was attractive.

Whatever the event is, Sywell is always lucky in having certain loyal visitors. Mr. Brett and Mr. Carrick flew over from Norwich, and Mr. Bentley and Mr. Watson flew down from Heston. Mr. and Mrs. Cubitt motored over. Perhaps the best effort was Mr. Rhodes, of the B.P. He heard about the dance at 4 p.m., left London with his wife at 7 p.m., and arrived at the Salon at 9.30! !

The Club Dance Committee who made all the arrangements and were responsible for the successful show are:—Mr. Shale, Mr. Harris and Mr. Reading.

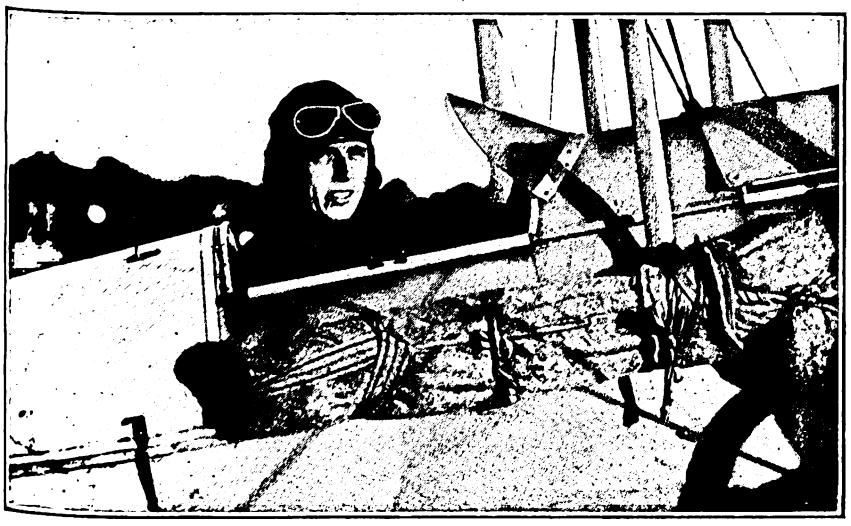
On Sunday, Nov. 8, the new president of the Club, Mr. W. Sears, of Weston Favell, had his first flight, or, rather, flights. He went up in one of the Club Moths, and also with Mr. Bentley in the Puss-Moth. He thoroughly enjoyed the experience, and hopes to do a good deal of flying in the future. Mr. Newton has resigned the chairmanship of the Club, which he has held since the beginning of things in September 1928. He has also resigned the editorship of *The Sywell Windstocking*, the amusing Club magazine he has started and edited so well. Everyone is very sorry he has had to give up these jobs, for he has done both excellently and has also done a very great deal otherwise for the Club. Mr. Geoffrey Linnell is the new Chairman, and Captain Addis is going to edit *The Windstocking*.—M. O.

### TOWARDS JAPAN.

Mrs. Victor Bruce has made steady progress during the week across a variety of national territories. After an unsuccessful attempt to cross the Annam Mountains from Korat on Nov. 5 she succeeded in getting to Hanoi next day. She is reported to have been decorated with the Order of the Million Elephants by the Governor of French Indo-China. On Nov. 9 Mrs. Bruce arrived at Hong Kong.

### A NOTTINGHAM FATALITY.

Mr. Ronald Leslie Wing, 20, of Cyprus Road, Mapperley Park, Nottingham, was killed at Tollerton on Sunday in a Moth belonging to the Nottingham Club. It crashed in a ploughed field. Mr. Wing was found dead strapped in the pilot's seat.



**HORTICULTURAL IMPLEMENTS.—Mr. Oscar Garden, his Moth, and his spare air-screw.**

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# COMMERCIAL AERONAUTICS.

## A SPLENDID SCHEME.

None will dispute the statement that the De Havilland Aircraft Co. Ltd. have done more than any institution in the World, official or commercial, to spread the use of aeroplanes to all Nations, and to give us in this country in particular the lead in private flying. Therefore nothing can be more natural than that D.H.'s, as the firm is familiarly and affectionately called all over the World, should evolve yet another scheme to promote the wider use of aeroplanes. The new idea can best be set forth in the firm's own words:—

While the extension and development of the Flying Club movement is of the utmost importance to the Aircraft Industry, we believe it to be a fact that the activities of many flying clubs are curtailed by the lack of capital resources to provide adequate equipment. We frequently hear the sentiment "We could very well do with another machine but we cannot afford to buy one."

On consideration of the circumstances it seems to us that provision of adequate and widespread tuition facilities is likely to be the "bottleneck" in the development of flying.

We have devoted considerable close study to the position with a view to finding a solution of the difficulties involved. Acting on our findings, we have decided to try the experiment of hiring out Moths to such Clubs as would care to avail themselves of the facilities which we offer.

An initial fleet of Gipsy Moths will therefore be made available immediately for this purpose. This fleet will be composed of brand new and unused Gipsy One Moths with wooden fuselages, and will be equipped with telephones, automatic slots and a compass. The machines will be fully insured by us against all ground and air risks, including third party risks, and will be available for hire at the following rates:—

| | |
|---|---|
| For any period of hire up to six months .. | £60 per month. |
| For any period beyond six month (providing there has been no break in the hire) .. .. .. .. .. .. | £50 per month. |

All fees will be payable monthly in advance.

Delivery (with empty tanks) must be taken at Stag Lane Aerodrome, to which machines must be returned at the expiration of the period of hire.

Machines must be maintained at the expense of the hirer in a correct airworthy condition, and must be operated in strict accordance with the provisions of the Air Navigation Acts.

In the event of the occurrence of accidents causing damage to the aircraft, the first £20 of the cost of repair must be met by the hirer. In cases where damaged machines have to be returned to this Factory for reconditioning, the hire fee will be suspended until the machine is again in airworthy condition.

When the Certificate of Airworthiness expires, machines must be returned to us for renewal. If available, another machine will be supplied in its stead.

The financial advantages of this scheme are many. Clubs will be saved the necessity of the substantial capital outlay involved in the acquisition of their own equipment. They avoid the lump sum payment of the annual insurance premium and also of the annual overhaul with its attendant delay and expense.

It is expected that this scheme will be welcomed by new Clubs in districts in which local support is not yet assured, where it will be advantageous to experiment with the temporary use of a machine in order to experience what support is forthcoming and to gauge the probable success of the enterprise.

It will also, we feel, appeal to old established Clubs in cases where their own permanent aircraft may become damaged by accident necessitating their being out of action for some time. In such cases a machine can be hired temporarily as a replacement in order not to arrest flying operations.

It is hoped that this carefully-planned scheme will be of interest and assistance to you and we trust, therefore, that this letter will receive the consideration of your Management Committee.

For the De Havilland Aircraft Company Limited
(Signed) F. E. N. St. Barbe (Business Manager).

## ANOTHER FAST TOUR.

Africa would shortly be used to the sight of passing Puss Moths but for the fact that they pass somewhat rapidly. On Nov. 6 Captain T. Campbell Black, managing director of Wilson Airlines Ltd., of Kenya, flew a Puss Moth on business from Nairobi to Dar-es-Salaam and back.

The journey was about 1,000 miles in all and took 12 hours with stops over a route by way of Zanzibar and Mombasa.

## A MULTITUDE OF COUNCILLORS.

[*The Care and Maintenance of Aircraft.* 99 pp., with diagrams. Airways Publications Ltd. Price, 3s. 10d. post free from The Aeroplane Book Department, Cannon House, Pilgrim Street, Ludgate Circus, E.C.4.]

The fourteen articles which appeared in *Aircraft Engineering* under the heading, Care and Maintenance of Aircraft, have been reprinted as a book, which will certainly be found useful and interesting by a large number of people who are concerned with operating aircraft, especially ground engineers.

The Preface by the Editor, Lieut.-Col. W. Lockwood Marsh, O.B.E., M.A., LL.B., F.R.Ae.S., states that these articles were written with the cordial co-operation of the Aircraft Inspection Directorate of the Air Ministry to provide a source of information for ground engineers and others who desire to become competent to overhaul every part of an aeroplane and its engine to make it fit for service. Though the buyer of the book must not imagine that after reading and inwardly digesting its ninety-nine pages he will be competent to overhaul every part of an aeroplane and its engine and make it fit for service, on the other hand, even the most competent ground engineer will certainly find something in every chapter which will either be new to him or will put him onto a fresh and useful line of thought.

The names of the authors of the various articles are themselves guarantee enough of the soundness of the contents. For example, Mr. McIsaac writes on the erection and alignment of the aeroplane structure, which some people in the Service still call "the glider," and others call "the air-frame," and he also writes on checking over the controls, supply systems and general inspection before flying.

Mr. S. G. Young writes on the inspection of the structure and component parts after overhaul, and deals with the inspection of engine installation and instruments.

That well-known authority Mr. W. P Savage writes on dismantling and top-overhauling engines and on the running-in of engines after overhauls and on routine inspection

Major A. A. Ross deals with the deeper subjects of workshop manipulation and testing of materials and parts for engines and on the complete overhaul and subsequent testing of engines.

Mr. R. W. Sloley, the authority on instruments, writes on the installation and testing of instruments for engine performance and on the installation and testing of instruments for aircraft performance. He also deals with the installation and checking of turn indicators and compasses. Incidentally, there is interest in noting that Mr. Sloley writes of "correcting" the compass against the effects of ferrous metals in its vicinity, and once he says "When the adjustments are finally completed," meaning compensation.

Mr. J. J. A. Gilmore, who probably knows about as much as there is to know about the manners and customs of metals, discourses on the composition, structure and treatment of metallic materials and on mechanical tests.

Finally, Mr. G. Rudorf writes on the non-metallic materials used in aircraft construction, such as timber and fabric and glue and dopes and varnishes and rubber.

The only criticism one has to make is that the book is an unhandy shape to hold in the hand and is printed on a paper with a shiny surface which reflects overhead light and makes it trying to the eyes of anybody who reads it for any length of time. But anybody whose livelihood depends on a really useful working knowledge of the subjects enumerated, or who wants to learn something about those subjects for the fun of pushing his knowledge down somebody else's throat, will put up with those minor inconveniences.—C. G. G.

## A CANADIAN DEVELOPMENT.

According to *The Daily Telegraph* the Canadian Government issued an Order in Council on Nov. 8 empowering the Canadian National Railways to participate with the Canadian Pacific Railway, Western Canada Airways, Ltd., and the Aviation Corporation of Canada in the formation of a company to be known as Canadian Airways, Ltd.

Western Canada Airways, Ltd. are the largest operating company in the Dominion and employ some 40 aeroplanes varying between 220 and 600 horse-power, with which they serve the northern territories of Ontario, Manitoba, Saskatchewan, Alberta, British Columbia and the Yukon, as well as operating the mail service across the prairies from Winnipeg to Calgary and Edmonton.

The two great railway systems, who are said to be subscribing £50,000 each to the venture, will make Canadian Airways, Ltd., a concern comparable in size to the largest in the United States. As the Canadian Pacific Railway Company also owns a line of steamships the combination will be one of the most comprehensive transport systems in the world, with unique arrangements for developing fast mixed time-tables.

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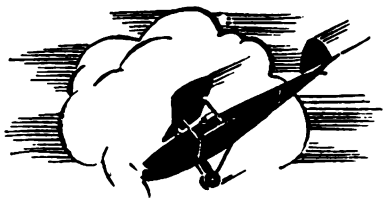

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# TRADE NEWS

## AN EXCELLENT ALLIANCE.

His many friends in the British Aircraft Trade and in all countries in Europe will be very pleased to hear that Major Jack Stewart has been appointed London Manager of the Aircraft Department of Boulton and Paul Ltd., of Norwich. His headquarters in future will be:—139, Queen Victoria Street, E.C.4, and his telephone number will be:—Central 4642.

In connection with this appointment some irresponsible journalist has caused a good deal of annoyance, and might have caused serious trouble, by stating in an evening paper that Major Stewart had been appointed "General Sales Manager" to Boulton and Paul Ltd. Big as the Aviation Department is, it is really only one part of the vast engineering business included under the name of Boulton and Paul Ltd., who in certain directions are the biggest manufacturers of their own particular kind of goods in the World. At present the Aviation Department is one of the smaller parts, but there is enough of it to occupy all the time and energy of even so energetic a person as Major Stewart, and we all hope that his business ability may help materially to make the Aviation Department before long one of the most important of the firm's departments.

In his new task Major Stewart will have the wholehearted backing of the new Chairman of Directors of Boulton and Paul Ltd., Captain Dawson Paul, who is himself a very keen aviator and a firm believer in air transport. In this he is unlike the heads of many great engineering concerns in this country and so the firm has a great advantage.

Furthermore Mr. J. D. North, the Technical Director of the firm, has long been recognised as one of the most able aeronautical engineers in this country. And consequently Boulton and Paul Ltd. have been entrusted with a great deal of important experimental and development work for the Air Ministry.

Major Stewart has been well known for ten or twelve years in the Aircraft Industry not only in this country but all over the Continent, and wherever he has gone he has impressed everybody with his sound business principles. He first came into the Aircraft Industry in the early days of the Aircraft Disposal Co. Ltd. and did much with that firm to introduce British aircraft into countries where we should never have got a footing but for the fact that we were able to sell first-class reconditioned machines at prices which competed with the products of other countries.

The business friends whom he made in those days have built up for him a personal connection which will be of great value to him in his new position. And the excellence of the quality of Boulton and Paul products will justify him in putting forth his full persuasiveness without mental reservations. Everybody will wish well to the alliance.

## THE METEOR ABROAD.

Those who were impressed by the Segrave Meteor when it appeared some few months ago will be interested to hear that Mr. Neville Stack, accompanied by Mr. J. Cameron, of Heston, recently flew the machine to Italy at the special request of General Balbo to demonstrate it to the *Regia Aeronautica* (The Royal Italian Air Force). For some weeks past the machine has been in Rome where it has caused something of a sensation.

## SERVICE.

The 19 Armstrong Siddeley Lynx engines of Australian National Airways Ltd. have now flown over a million and a half engine-miles. During this time not one regular service flight was uncompleted because of mechanical failure.

This is fresh evidence of the amount of civil flying which is now being done in Australia. The Commonwealth, as Mr. Fairey pointed out in his recent lecture on the Growth of Civil Aviation, is one of the most promising markets to which the manufacturer has to look, and Armstrong Siddeley engines are certainly adding to their goodwill by such unflagging service.

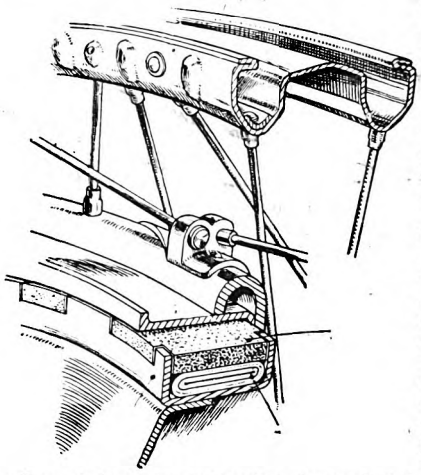
## THE PALMER WHEEL BRAKE.

Now that aeroplanes are regularly used for transport, and must therefore be properly manœuvrable on the ground, as well as being able to land in a confined space, wheel-brakes are beginning to appear as normal equipment. One of the most effective brakes at present available is that developed by The Palmer Tyre Co. Ltd. This brake as reported in THE AEROPLANE, gave a very good account of itself in the *Rundflug* when fitted to the Spartan Arrow. It will also be seen on the new Handley Page 40-seaters.

The Palmer brake is of the fluid-pressure type and either air or oil can be used. The Spartan Arrow had the oleo system, the Handley Page 40-seater is to use the pneumatic arrangement. But in either case the principle is the same.

The wheel itself has a normal type of brake-drum which revolves with the wheel. The cupped disc which fits inside the drum has a channel around its circumference in which lies a flattened tube of rubber composition. Outside this tube is a ring of blocks which are made from some braking material and have specially shaped extensions. These extensions fit the castellations in the walls of the channel and are thereby prevented from turning round with the drum.

Inflation of the tube forces the blocks uniformly into contact with the drum and thus secures the maximum braking effect with the minimum of pressure. The only parts that are likely to wear are the blocks and these can be readily replaced by lifting out the whole expansion unit and putting another one in its place.



In the oil-filled system a small container full of oil keeps the system up to capacity and makes up for any loss. The pressure is obtained from two extremely neat and light pumps which are worked by pedals. These pedals are placed conveniently to the pilot's heels or toes as required. An extremely ingenious arrangement of cams ensures that as the pressure increases the leverage of the pedals also gets greater. Communication between the system and the oil container is prevented immediately the pump begins to work. As there are two pumps a differential action can be obtained and steering on the ground becomes easy.

The air-pressure system is much the same but the compressed air is contained in a flexible reservoir of rubber reinforced with Palmer Cord. This has an ample factor of safety and is much lighter than a steel cylinder would be. Relay-valves which are worked through pedals apply the pressure to both or either wheels, thus making possible a differential action. This differential action can also be applied through a hand-lever which can be pulled straight back or to either side.

In fact this ingenious Palmer principle can be used to suit any design or other requirement.

## AN ADDRESS TO BE NOTED.

The Robinson Aircraft Co. Ltd. desire the fact to be known that their address in future is:—Stafford Road, Croydon, Surrey, and their telegraphic address is: "Redwing," Croydon.

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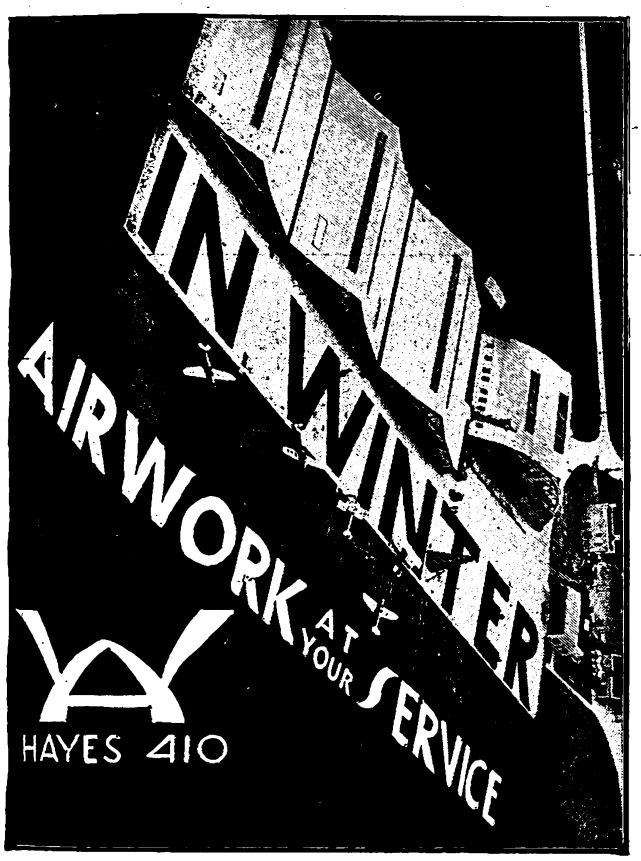


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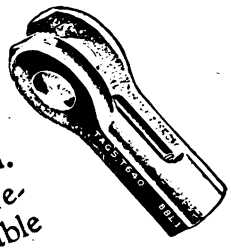

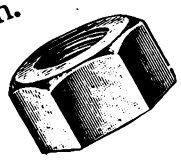

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## PRESSING BUSINESS!

On Nov. 7 Mr. W. Lawrence Hope, manager of Air Taxis, Ltd., accompanied by his chief pilot, Mr. Birkett, landed at Croydon after a very fine flight of 5,050 miles in five days. He brought noise-films from Addis Abbaba of the ceremonies which signalised the coronation of Ras Tafari as Emperor of Ethiopia, and did a piece of navigation and flying with his Puss Moth that was remarkable at this season of the year.

His stages were Addis Abbaba-Khartum, Nov. 2 (15.00 hours to 23 hours), 650 miles; Khartum-Cairo, 1,100 miles; Cairo-Benghazi, 900 miles; Benghazi-Tunis, 900 miles; Tunis-Nice, 800 miles; Nice-Croydon, 700 miles. As Messrs. Hope and Birkett landed at 15.00 hours their flying days work out at exactly five.

The first stage was a short cut across very difficult country which involved serious dangers in case of a forced landing. The aerodrome at Addis Abbaba is at an initial altitude of 8,500 ft. so that the useful load was reduced to the plates only and most of the emergency kit and spares were left behind.

The whole exploit is, in itself, worthy of the highest credit, but when incentive turns out to be only the delivery of news-reel pictures a day or two sooner than reasonably safe progress would have brought them the end scarcely justifies the undeniable quality of the performance and the risk involved.

As Mr. Hope himself has stated in print, his confidence in the Gipsy III engine of his Puss Moth was amply justified, and the same might also be said of his K.L.G. plugs, the Husun aperiodic compass and Smith's Aircraft Instruments.

The following letter from Mr. Norman J. Hulbert, of British Movietonews Ltd., emphasises the excellence of Mr. Hope's performance:—

"About three weeks' ago we decided that we required an aeroplane to bring back the sound films from Addis Abbaba, in Abyssinia. About 4 p.m. on Friday, Oct. 17, I first approached Hope of Air Taxis, terms were fixed up that evening, and Hope spent Saturday fitting long range tanks, etc., to his Puss-Moth. At 6 a.m. on the Sunday Hope and Birkett left Croydon en route for Abyssinia, and they took the journey quietly, occupying about ten days.

"On arrival at Addis Abbaba Hope was met by a Guard of Honour of the local army, of whom he has many amusing stories. Hope was present at the Coronation, and the King conferred a high order upon him.

"Having obtained the negative, he set off on Sunday, Nov. 2, on the return journey. His times and distances on the return journey are as follows:—

Sunday.—Addis Abbaba 3 p.m.—Khartum 11 p.m.—650 miles.

Monday.—Khartum 3 a.m.—Cairo 5.45 p.m.—1,100 miles.

Tuesday.—Cairo 4 a.m.—Benghazi (N. Africa) 6.15 p.m.—900 miles.

Wednesday.—Benghazi 3 a.m.—Tunis 6.30 p.m.—800 miles.

Thursday.—Tunis 4.30 a.m.—Nice 5.30 p.m.—700 miles.

Friday.—Nice 6 a.m.—Croydon 3 p.m.—700 miles.

I am writing to tell you this story because I think it is the first occasion on which an aeroplane has been used for bringing sound news reels to this country from such a great distance and also because this performance is such an amazing tribute to the skill of Hope and Birkett and also to the reliability of the Puss-Moth.

For part of the journey Hope was flying over uncharted jungles, where machine failure would have meant certain disaster.

I hope you will be able to mention this flight in the columns of The Aeroplane, and in conclusion I would only again emphasise what a marvellous performance Hope and Birkett have put up and how we appreciate the way the whole expedition was undertaken by them.

## AN OFFER TO AIRCRAFT OWNERS.

National Flying Services, Ltd., are offering reduced prices to clubs and private owners who want work done on their machines during the Winter months.

The equipment of the Hanworth shops is unusually comprehensive and every class of repair and overhaul is catered for. Plant has been installed for woodworking, welding, forging, sheet-metal work, fabric work, doping, painting and engine-testing. Moreover (the firm states) there is a resident A.I.D. Inspector.

The reconditioning of engines can be entrusted to Hanworth with every confidence that it is in good hands and that the engine will be given a proper test-run before being passed out. The plant includes an engine test house equipped with an adequate dynamometer, which, incidentally, is available on contract for engine tests up to 250 h.p. Apparatus for testing petrol tanks, magnetos and plugs is also available, and a complete range of Cirrus spares is always in stock. A Black and Decker outfit, of the type recently described fully in The Aeroplane, and a paraffin tank are used for engine cleaning.

Private owners who are anxious to ascertain the exact weight of their machines are aware of the rarity of weighing machines. Hanworth is one of the few aerodromes where a proper aeroplane weighing machine is available. It can be used on payment of a small fee.

## A MISFIRE.

An English visitor to Italy has brought back a really amusing story. Some few weeks ago Mr. Sidney St. Barbe and Major Jack Savage went to Rome to demonstrate the value of skywriting. By way of giving it a good start Mr. St. Barbe went up and wrote "VIVA IL DUCE" over the Eternal City. According to the teller of the story the skywriting produced a fifteen minutes silence in the city. Everybody came out and watched the performance, petrified with astonishment. He even alleges that a regiment of infantry marching along the Appian Way lost direction through trying to march with their eyes up in the air and fell over the edge of the road in heaps, but that is probably imagination.

To the surprise of everybody concerned the Roman papers next morning dismissed the whole marvellous manifestation in about three lines, merely remarking that somebody had done some skywriting, without mentioning names. Naturally certain worthy Fascists regarded this as a slight on the Great Mussolini, in whose honour the demonstration had been made.

The explanation given by the papers was, quite simply, that they had had instructions that no aerial performances were to be mentioned unless they were done by Italian aeroplanes and Italian pilots and that this was undoubtedly a foreign affair. Which only shows that orders can be interpreted too literally,—even when the desire is to please a Dictatorship which can shut down a newspaper on the spot.

## MANY INVENTIONS.

Have you ever visited the Editorial Offices of The Aeroplane, at 175, Piccadilly?

You may do so in a number of guises, as, for example, servilely as becomes a contributor begging his bread or thunderously God-like with a small advertisement to insert, or your guise may be that of the intelligent reader come to argue with the Editor about Snooping Mongol hordes and what the pale-eyed Nordic ought to do about them. In any case you will be impressed.

The outer door is kept by a small man whose abdomen is more often than not (in these trying times) heraldically bedizened with a poster, bearing news of the latest air crash in scarlet letters. He will try to sell you an evening paper gnomishly, but you hurry past.

Within there is a magnificent Nogood Waitis lift, fitted with slots and of definite helicopterous intentions, but it is still on the Air Ministry secret list, and has never been known to make an ascent. You toil up a flight of stairs and find yourself suddenly confronted by what you take to be the dry and withered cadavers of disused contributors, but a second glance assures you that they are mournful macintoshes on coat hangers. This is no repository of lost souls but of lost railway property.

Nevertheless, as you edge past and breast the one in three gradient of another flight of stairs, you reflect bitterly that perchance the Editor sells his waste paper to the Lost Property shop and that much of it was once yours. Your mind especially lingers upon one magnificent fable you wrote, which though distinctly libellous, was to place you permanently on a par with La Fontaine, Uncle Remus, old Æsop, and most modern politicians. You sigh and pass on, glad at least, to be alive.

You trail down a long and gloomy corridor, smelling faintly of yesterday's tea, and come upon a white mural

Fit "TripleX" Regd -and be safe!
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# AUTOMATIC SLOTS

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"If the machine had had slots it certainly would not have spun and he might have sat it down flat."

"The Aeroplane,"
10th September, 1930.

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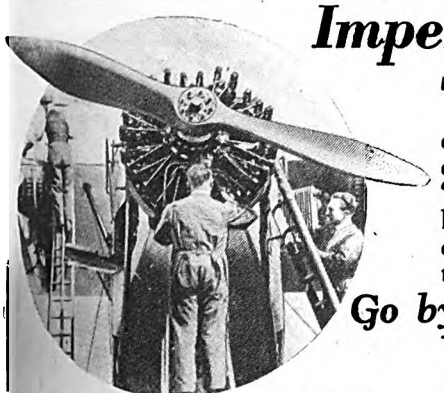

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C.F.H.



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tablet, which announces THE AEROPLANE offices, and hints quite definitely that you personally are about to make some fiendish noise, although those in the corridor want to work. You still the creaking of your shoes (wishing you had worn your plimsols) and breathing batedly, you crawl down the corridor.

Your knock is ignored, and so you enter, perspiring, timidly. If you are a contributor, a dog which lives exclusively on synthetic bones made of indiarubber growls at you, but if you are an Advertiser it wags a welcoming stern and fawns on you.

There is tea—tea eternally from fat brown teapots, and biscuits, and friendly folk gesticulate at you with kettles. From the Editorial sanctum come gargantuan guffaws, not, you feel sure, on account of your supposedly humorous manuscript, but in regard to some deadly serious article designed to revolutionise Aviation. Blokes of great charm and ample leisure stroll in from other rooms to tell you funny stories, and the atmosphere is one of infinite peace and goodwill steeped in tea.

You are reluctant to exchange it for the harsh hustle of Piccadilly, but it is only when you find yourself outside that you realise the true inwardness of that jesting mural tablet demanding silence, while the Staff brew tea—and ever more tea.

[Truly Spry deserves to rank with the great writers of fiction. But we admit to the Tea, which the Editor approves as a stimulant to extort yet more work out of an over-driven Staff.—THE AEROPLANE SOVIET.]

Mr. Laurence Hope accompanied by Mr. Birkett (whose book "With Laurence in Ethiopia") is eagerly awaited, made an amazing 5,000-mile trip in five days, cutting off a corner of darkest Africa to get ahead of his rivals, and there (according to *The Daily Mirror*) encountering a new and hitherto uncharted range of mountains, the highest peak of which should certainly be named Mount Esperance. Another pilot on the same business got his photographs telephotographed from Marseilles, where it is understood he had to stop owing to illness. Both lots of photos got into their respective papers on the Saturday morning, but Hope's lot, which he brought personally, were the best and clearest.

One delightful result of these epoch-making flights was a portrait of an Ethiopian in a voluminous bath mat and a battered tall hat, who was definitely scheduled by Royal warrant as a fifth-class gentleman. Instead of having our fifth-rate gentlemen loose about the place, thinly disguised as Company Directors, Newspaper Magnates, or Aviators, would it not be better to have them officially graded and made to wear a battle-scarred tall hat as the outward and visible sign of their fifth-rateness?

The Fokker F.IX complete with Mr. Smirnoff and Mr. Aler, pilots, and Mr. Strykers and an assistant in charge of wireless, came to Croydon recently for compass adjustment before leaving for Batavia. This machine had on board three wireless sets, long-range, short-range and direction-finding. The machine will carry, besides two pilots and a crew of four, the necessary rations and water, and spares for engine and machine so complete that they include a tail trolley and jack, and petrol for 1,000 miles' flying (which weighs a considerable amount).

With all this, and a pay load of over 1,760 lbs., the machine will cruise at 126 miles per hour, and will, not only according to official Netherlands Air Ministry tests, but also according to Mr. Smirnoff, fly on any two engines when fully loaded with about 150 revs. to spare. It appears to be quite a good proposition for long-distance mail work, and with a commercial aeroplane of this sort, air mail users should have little cause to grumble.

Where—*Sunday Express* readers are saying all over the World—where is our Maisie, the Vicar's flying daughter? Surely after stirring the Habitable Globe to its depth by her daring flight to Berlin, Maisie should have earned another full-page in the newspapers by *purchasing* a ticket to Paris (especially as fares are reduced) and adding another thrilling aeronautical triumph to her score. As a matter of fact, Wardour Street was just going to bring out a song about Maisie, our latest heroine aviatress, in which by way of novelty Maisie was to be subtly rhymed with daisie, when she went and let them down. Another new feature was to have been a photo of Maisie on the cover, smiling in a flying helmet. As they are saying in that quarter, "Aw, c'm on Maisie, have a heart, girl, and *do* somethink."—SPRY.

## RECEIVERSHIPS (APPOINTMENT OR RELEASE).

SAFETEX SAFETY GLASS LTD.—H. C. S. Bell, of 22, Bedford Row, W.C., was appointed Receiver and Manager on Nov. 4, 1930, under powers contained in first mortgage debenture dated June 30, 1930.

## PERSONAL NOTICES.

FORTHCOMING MARRIAGE.

TRAILL—HARVEY.—The engagement is announced of Flt. Lt. Thomas Cathcart Traill, D.F.C., R.A.F., fourth son of the late Edmund Bernard Traill, of Chiru, Argentina, and Mrs. Traill, of Fir Grove, Ottery St. Mary, Devon, and Frances Marion Harvey, only daughter of Maj.-Gen. D. Harvey, C.B., C.M.G., C.B.E., and Mrs. Harvey.

DEATHS.

BARNETT.—On Nov. 4, at Ingatestone, Essex, as the result of a flying accident, Max Ian Barnett, Flg. Off., R.A.F.

Mr. Barnett entered the R.A.F. with a short service commission in March, 1928, and after a course of flying-training at No. 5 Flying Training School, Sealand, he was posted to No. 56 (Fighter) Squadron, North Weald. He was a qualified Armament officer.

GOAD.—On Nov. 4, at Manston, Kent, as the result of a flying accident, Frederick Robert Walter Goad, Flg. Off., R.A.F.

Mr. Goad entered the R.A.F. with a short service commission in February, 1929, and after a course of flying-training at No. 1 Flying Training School, Netheravon, he was posted to No. 9 (Bomber) Squadron, Manston.

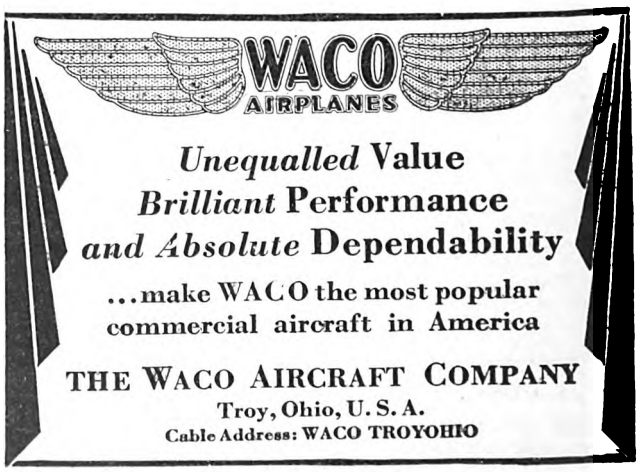
ROBERTS.—On Nov. 4, at Manston, Kent, as the result of a flying accident, Serjeant George William Roberts, R.A.F.

WING.—On Nov. 9, at Tollerton, as the result of a flying accident, Ronald Leslie Wing, son of Mr. and Mrs. A. L. Wing, of Sheffield.

BIRTHS.

MYLNE.—On Nov. 7, 1930, at Blair-Adam, Kinross-shire, to Eleanora Constance, wife of Sq. Ldr. A. W. Mylne, R.A.F.—a son.

YEATMAN.—On Sunday, Nov. 9, 1930, at 82, Oakley Street, Chelsea, to Mr. and Mrs. H. M. Yeatman—a son.





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| Normal Engine R.P.M. ... | 2,000 | 2,000 | 2,000 | 2,000 |
| Maximum ,, ,, ... | 2,200 | 2,200 | 2,200 | 2,200 |
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The Aeroplane
Nov. 19, 1930.
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Vol. XXXIX. No. 21

# THE AEROPLANE

6d.
Weekly.
INCORPORATING AERONAUTICAL ENGINEERING
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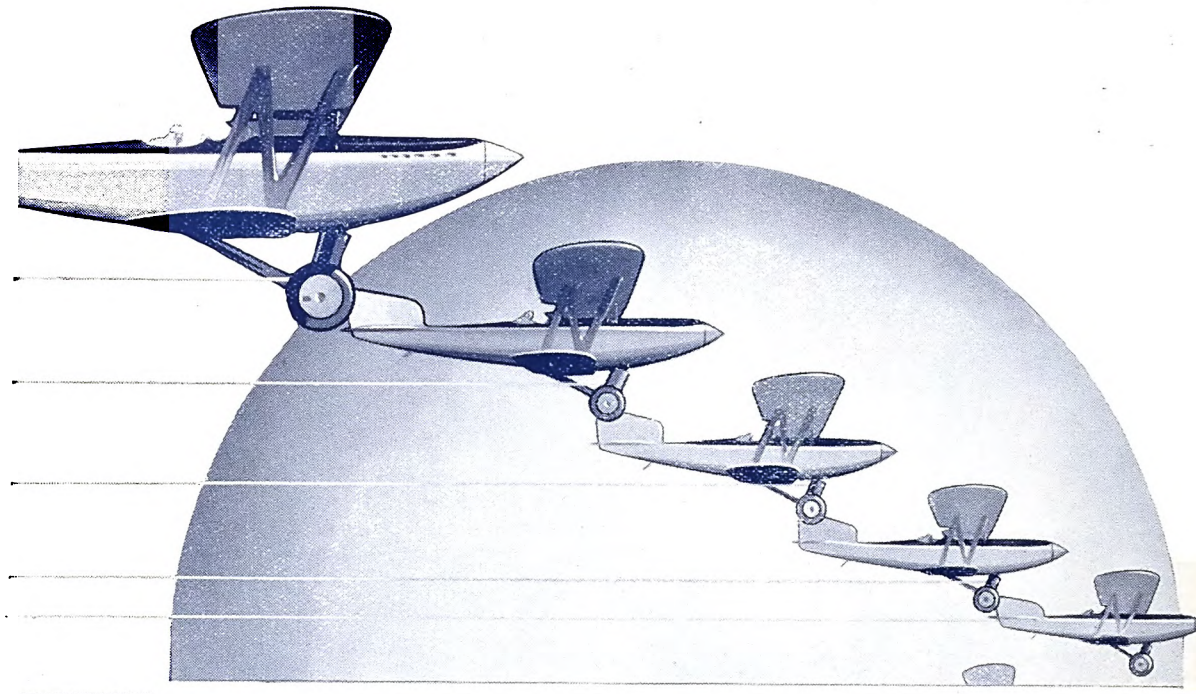

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Incorporating

Aeronautical Engineering

VOL. XXXIX

No. 21.

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## ON THE FOUNT OF BRITISH FLYING.

Boasting may be wrong and pride may be sinful, but the pride which apes humility is foolish. So why should we deny the fact that the all-round level of flying is higher in the British Empire than in any nation in the World. We may admit that nine out of ten flying accidents, fatal or otherwise, are caused by recklessness or sheer foolishness and are euphemistically called errors of judgment. But even they are caused by good flying gone wrong rather than by bad flying.

If anyone asked why our flying is so much better than anybody else's, what would be the right answer? Probably most people who know a good deal about flying would say that our Service flying is good because of the excellent system at the Flying Training Schools of the Royal Air Force, and that our Civil flying is good because of the excellence of the instructors at the Flying Clubs and at the various proprietary schools of flying. And all their instructors come from the R.A.F. Some might add that being at the same time the best horseriding and seafaring people in the World, our instructors have the best material on which to work.

All of which is quite true. But who taught the instructors how to fly and how to instruct? The finest pilot in the World may be, and generally is, the worst instructor,—the more instinctively a man does a job the less likely he is to be able to explain how or why he does it. And a good instructor may not be himself a first-class pilot, and so may fall short of the high standard which seems common to all our schools of flying.

The answer is that all our instructors owe their excellence to the Central Flying School of the Royal Air Force. That is where first-class pilots are taught how to teach others what they know, and where people who know how to teach are taught to become first-class pilots. Also, which is just as important, it is where people who fancy themselves as pilots or as teachers are ruthlessly turned down if they fail to come up to the combined standard of instruction on which the high quality of British flying depends.

The Central Flying School, more commonly known as the C.F.S., has never been given the credit which is due to it for all it has done since flying first began in this country. So I propose to place on record here as much as I can in the space we can spare about the work this excellent institution has done, in spite of the fact that from time to time some self-opinionated young fool writes and says, that ancient history does not interest the youth of to-day, who look forward and not backward. The same young fool does not realise that history is the greatest plagiarist in all literature, and repeats itself to such an extent that if one knew all history one would never make a mistake in life, because one would know of all the mistakes which can be made.

There is precious little difference between to-day and the times when Nimrod imported foreign labour to build the tower of Babylon (or Babel), or when Jacob swindled Laban over the cattle, or when Joseph cornered the corn-market in Egypt, thanks to Imperial Preference, or when the municipality of Rome, under Augustus, decreed that blocks of flats in the Eternal City must not be more than eight stories high. However, those who would rather learn from bitter experience than from history need not read this stuff.

### THE C.F.S. DINNER.

What brought up the matter of the Central Flying School was this. Some few weeks ago three or four young officers in, or lately retired from, the R.A.F., who had served at the C.F.S., were talking in the R.A.F. Club when they were suddenly smitten with an intelligent idea. Somebody suggested that past and present members of the Staff of the C.F.S. ought to have a dinner all to themselves, and the rest agreed, and they nominated one Flt. Lt. Christopher Clarkson, lately R.A.F., to act as secretary. And so a dinner was arranged, and duly took place on Friday last, November 14.

There was rather a charming touch of snobbishness, or swank, if you like to call it so, about the idea, but it was of that kind which is good for moral and esprit-de-corps, and all that sort of thing. A man may belong to the best squadron in the R.A.F. of any given date, and be proud of

**"LET'S WARM OUR BRAINS WITH HALF A DOZEN HEALTHS. AND THEN DAMN COLD DISCOURSE, FOR WE'LL SPEAK FIREWORKS."**

(FLETCHER AND MASSINGER—*Elder Brother.*)

**THE FIRST GATHERING OF THE C.F.S.—At the top table (on the right) numbering from the right,—Major Mayo, Wing Cdr. Pretyman, Air Commodore Pitcher, Air Vice-Marshal Longmore, Group Capt. Baldwin, Air Commodore MacEwen, Air Vice-Marshal Sir Godfrey Paine, Marshal of the R.A.F. Lord Trenchard, Group Capt. Nicholl.**

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it, but the same squadron may become the worst a year or two later. Also, people are shifted from one squadron to another so much that a man never belongs to a squadron as an Army officer belongs to his regiment,—and apparently such adherence is impossible by nature of the organisation of the R.A.F., which is more like that of the Navy, in which officers and men shift from ship to ship and never give their whole devotion to one. Which is a pity, but what can be done about it? But when a man has once been on the staff of the C.F.S. he has something of which he may be justly proud for life.

The Staff of the C.F.S. are the people who instruct instructors how to instruct. An instructor at an F.T.S. may have passed out of the C.F.S. as Grade A1, which means that he is the finest known kind of instructor, but he is still one step below the sacred Staff who instructed him, or at any rate tested his ability and passed him out as A1. Therefore, having been on the Staff of the C.F.S. means that there just isn't any higher level which a man can reach as a pilot, and as the possessor of that particular kind of intelligence which is needed to teach flying.

Mark you, a member of the C.F.S. Staff might be a very bad Staff officer or a still worse formation leader, and the best Staff officer might not be able to fly at all, and the best formation leader might be a shockingly ham-handed pilot—life always has its compensations. But in its own line the C.F.S. Staff is a thing apart, and, after all, we do owe it full credit for making British flying what it is.

### At the Dinner.

The originators of the idea of the C.F.S. Dinner then asked Air Commodore N. D. K. MacEwen, C.M.G., D.S.O., now Officer Commanding No. 22 Group, Inland Area, to be Chairman, and he accepted because, as he said, he had at any rate commanded the C.F.S. for a longer period than anybody else had done. Actually, he commanded for about four years, beginning in 1920 or so, and he was Adjutant of the old original C.F.S. in 1916, and learned to fly there, so who could have better right among serving officers to take the chair?

Then the organisers asked as the guests of the evening Air Vice-Marshal Sir Godfrey Paine, K.C.B., M.V.O. (retired), the first Commandant of the C.F.S., and his Chief Staff Officer and Assistant Commandant, Marshal of the R.A.F., Lord Trenchard, G.C.B., D.S.O. Also there were present Air Vice-Marshal A. M. Longmore, C.B., D.S.O.—Air Officer Commanding at Cranwell,—who, as one of the first three Naval officers to fly, taught Sir Godfrey Paine to fly—and Air Commodore Duncan Le Geyt Pitcher, C.M.G., C.B.E., D.S.O., a war-time Commandant, and one of the First Course at the C.F.S., and Group Captain J. E. A. Baldwin, D.S.O., O.B.E., the present Commandant, which made the occasion just as it should be.

All told, there were between forty and fifty of the past and present Staff at the dinner, which was very good for a first attempt. The organisers hope that there will be many more at the next dinner. The suggestion was made that it should be an annual affair, fixed for the first Friday in November. That seems thoroughly sound.

After dinner Air Commodore MacEwen read a letter from Air Chief Marshal Sir John Salmond, Chief of the Air Staff, and one of the first Instructors at the C.F.S., regretting that a previous engagement kept him away. Also a telegram was read from the Sergeants' Mess at the C.F.S., wishing success to the party,—a fine proof of the survival of the good feeling between officers and men, which has always existed at the C.F.S.

### Lord Trenchard on the C.F.S.

Thereafter Lord Trenchard proposed the toast of the R.A.F. coupled with the name of Sir Godfrey Paine, and remarked that a C.F.S. dinner was long overdue. He told the assembled company how much the C.F.S. owed to its first Commandant, and how in those early days, when the War Office was more bound up in routine than it is now, Captain Paine, R.N., as he then was, managed to break through official procedure and get what the School wanted. And he told how splendidly, thanks to Captain Paine's lead, the mixed personnel of sailors, soldiers, and civilians, officers and other ranks, worked together and built up that tradition of keenness which is still the tradition of the R.A.F.

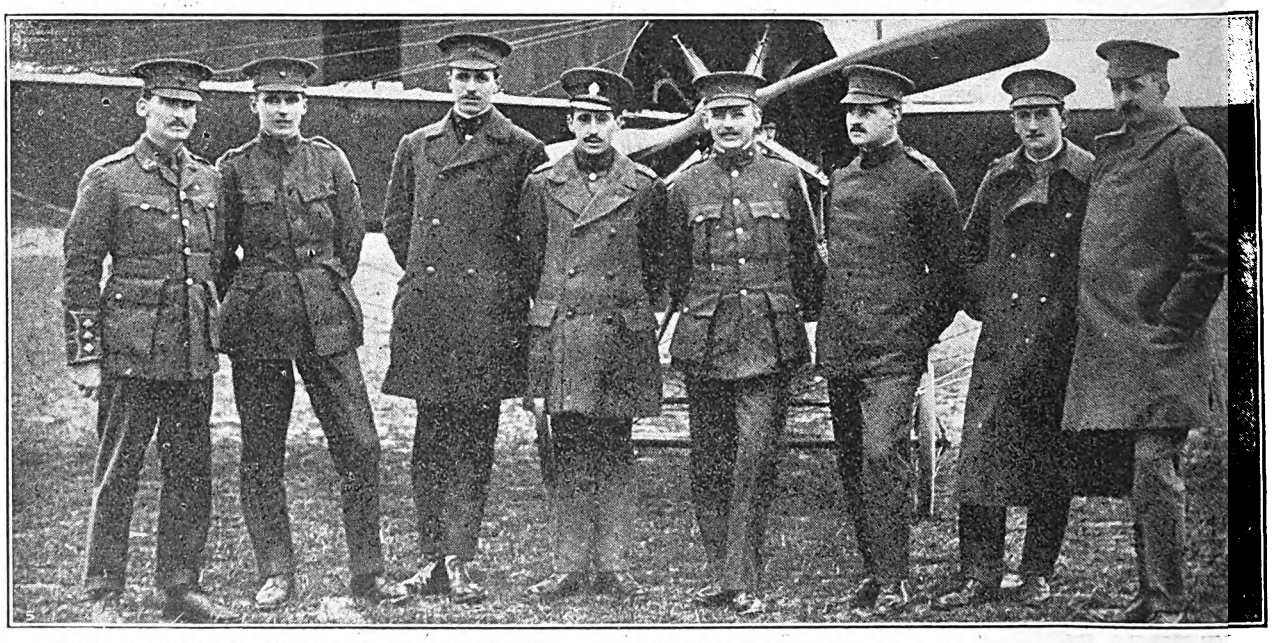
He said that quite recently, when driving up North, he pulled up alongside the C.F.S. at Wittering,—and was promptly moved on by the corporal on duty. He stopped further on and watched the flying, and saw people still doing the things they were told not to do, just as they used to do in his own time at the C.F.S.—which showed him that the old spirit had been handed down.

I imagine that Lord Trenchard was thinking back to the days when people like Gilbert Mapplebeck and Dalrymple Clark used to sneak away from Upavon to distant parts of Salisbury Plain, or hide behind clouds, and see whether the B.Es. built at the Royal Aircraft Factory would come to pieces if they were made to loop in the same way as M. Pégoud had recently looped a Blériot monoplane. The Major Trenchard of those days always had a kindly tolerance for those who broke the Law decently and in a becoming manner—and, after all, that is the true secret of England's greatness.

Sir Godfrey Paine's health was drunk with such acclamation as would have shaken even a sterner man than he. And the acclamation was none the less heartfelt because hardly anybody present, except Air Commodore Pitcher, could have served at the C.F.S. under Captain Paine and Major Trenchard, and many of the youngsters now on the Staff of the C.F.S. had never even seen him. Godfrey Paine, and his stick, and his flow of rhetoric on the heads of the unworthy seem to have passed as a tradition from the days when he was known as "The Owner" (like the captain of a ship) at Upavon down to the new C.F.S. at Wittering. And there is a certain kick to be got out of meeting a legend face to face and finding that it comes up to all one has heard about it.

### Those Were the Days.

In those early days of the C.F.S. and of The Aeroplane nearly twenty years ago I was allowed, by grace of The Owner and his Chief Staff Officer, to go about the C.F.S. without being arrested at once as subversive of discipline, and I remember that every morning a junior officer with field-glasses was stationed at the corner of the Officers' Mess (a long wooden hut which overlooked the valley) to watch The Owner's house down in the village. If he came out in field-boots and breeches all was well, and everybody



**SOME OF THE PIONEERS.—Left to right, George Dawes, Vivian Wadham, Fox, Lawrence, Brooke-Popham, Dan Connor, ——, and Allen, at Larkhill.**

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assembled on the front of the Mess to say "Good morning, Sir," blithely and heartily. But if he came out in trousers and big boots then he had gout, and everybody found urgent duty in the depths of the workshops or the flight sheds.

Also, there was an unfortunate officer in a Henry Farman (a 50 Gnôme pusher) who lost his engine when landing and trickled slowly down the slope till the nose of the nacelle bumped gently into the balcony of The Owner's office. The Owner saw him coming and awaited him glaring. The officer, helpless in the nacelle, saw where he was going to and what was coming to him, and sat like a rabbit watching a boa-constrictor. They said that when the storm burst he was already unconscious.

Yet another, one Marsh, likewise trickled down with a dead engine, but ran across the road at right angles and stood on his nose the other side. The nacelle folded up and the petrol-tank sat on his neck and poured petrol over him. The machine was pulled off him and he emerged unhurt and grinning. By then The Owner had arrived, complete with stick, and wanted to know what he had to grin at. The victim explained that he was pleased at not having broken his neck. "Never mind about your neck," said The Owner, with appropriate metaphor, "What about my aeroplane? We've only got six!"—And he cast him with contumely to the vengeance of the other pupils.

So far as I can remember only one officer ever scored off the Commandant, and his Chief of Staff, whose deep, staccato, monosyllabic method of conversing had already earned for him the title (rather than the nickname) Boom, which has stuck to him ever since. That officer was the great expert in Maurice Farmans, and suggested that the Army would be highly impressed if the C.F.S. proved that an aeroplane could be flown fifty miles a day every day for a month,—an amazing idea in those days. So every morning bright and early he flew over to Newbury Race Course before the wind rose, and every evening he flew back after the wind had gone down. And he did it for twenty days before they found out that he had a girl friend staying at Newbury. But they let him, or made him, finish the thirty days.—That, however, is all by the way.

### The Owner.

Sir Godfrey Paine's speech was about the most successful after-dinner effort I can remember. Some youngsters may not care for history, but whenever he paused and suggested that he was boring them they shouted for more history. So seldom does one hear authentic history from the men who have made it.

He told us how, when the Royal Flying Corps, with its Naval and Military Wings, came into being, he was Captain of H.M.S. *Actæon,* at Sheerness, on whose books were carried the first three Naval Officers and a Marine who were allowed by Their Lordships of the Admiralty to learn to fly,—at Eastchurch. Mr. Winston Churchill, then First Lord of the Admiralty, had a brainwave and thought of the idea of a Central Flying School where officers of the Navy and the Army, and some selected civilians, would be taught to fly. He (Capt. Paine) was called to the Admiralty and told that he was to take command,—presumably because theoretically he already commanded the four pilots at Eastchurch. He was told that he must learn to fly before May 1,—and the date was then April 10 or so, 1912.

So he went to Eastchurch and told Lieut. Longmore that he had to teach him in the time. Next day at dawn they went out, but there was too much wind,—the leaves were fluttering. That evening he did his first flight. And in ten days or so he flew alone the four figures of eight which then qualified a man to be considered a complete aviator.

After that he was planted down on Salisbury Plain, with a few men and half a dozen cars to build a Flying School. According to him The Aeroplane of the period damned it in heaps as an arid waste, and was rude to it generally, but ended up by saying that no flying school in any country had ever started under better auspices. (I must look up this reference. Sir Godfrey certainly has a wonderful memory.)

The next thing that happened was that twenty-four pupils were unloaded on him and his Staff of Instructors, who hadn't an idea of how to instruct, because they had only just learned to fly themselves. There were sailors and marines and guardsmen and sappers and highlanders and gunners and cavalrymen (including Indian cavalry) and mudcrushers and civilians,—and the other ranks included C.P.Os. and E.R.As. and A.Bs. and stokers and carpenters and sergeants of the Guards and engineers, and infantry privates and civilian garage mechanics. But they all had one thing in common, they were all dead keen on flying or on making aeroplanes fly.

There was no code of punishment, because they belonged to different services, and the civilians were not liable to the code of either Service. Yet he had no trouble which was at all serious. All the time he was at the C.F.S. he found the same spirit. People were much more concerned about doing their jobs than anything else.

He told the young officers present that in spite of all that they and the C.F.S. had done they hadn't an idea of how much there was still left to do in developing flying. All the important transport of the future would be done by air and they were young enough to see such things happen, and help in the making of air transport.

Finally he thanked Flt. Lt. Clarkson for organising the dinner and giving him the evening of his life. He hoped the C.F.S. dinner would become a regular institution and promised to come to it regularly so long as he lasted.

Sir Godfrey Paine is a young man still, and he has never looked fitter in his life. His knowledge of aviation and his faith in flying ought not to be wasted. None knows better than he how to cut through red tape and regulations. Why does not our intelligent Government make him Director of Civil Aviation?

### The Present Commandant.

Group Capt. Baldwin, who won fame during the War 1914-18 by raising and training and leading in Flanders and in the Independent Force that historic 55 Squadron which always grew its own commanding officers as its C.Os. were promoted or invalided, told us what a fine station the C.F.S. is to command, thanks to the spirit which was built up in those pioneer days. He described the system by which instructors at the C.F.S. keep in touch with the Flying Training Schools, and how the F.T.S. instructors come back to the C.F.S. for refresher courses and bring back with them new problems which they have met in the course of changes in the equipment and organisation of the Schools, and in handling different types of pupils. He expressed his belief that the form of words evolved at the C.F.S. for the use of instructors,—commonly known as the C.F.S. "patter,"—is the best thing of its kind in existence.

He announced that the Coat of Arms of the C.F.S. had just been composed, or compiled, or approved, or whatnot, by the College of Heralds, and will soon be made public. He also announced that the C.F.S. colours, which may only be worn by C.F.S. Staff, can only be got from the C.F.S. Mess. He explained that the thin silver edge on the green, black, and purple indicates the Wiltshire Avon, which flows along the west side of the old C.F.S., and is thus commemorated at Wittering.

Some wit suggested, incidentally, that the black stood for the old tarred huts at Upavon, the purple for the first Commandant's language, and the green for the preternatural innocence of his first Chief Staff Officer,—when he first joined, naturally.

After that the meeting dissolved and people just talked. It certainly was a good show. And as one who helped to make the original C.F.S.—on the lines of the clown in the circus who runs round and makes foolish remarks while others do the work—I am delighted to see how like the latest generation are to what the first generation were. Let us hope there is another Trenchard and another Godfrey Paine among them.

### Changes at the C.F.S.

Naturally there have been big changes in the organisation of the C.F.S. since its beginning. Originally it was intended to train all pilots for the Naval and Military Wings. Then the Navy broke away and made Eastchurch its Training School and the C.F.S. became the sole property of the Royal Flying Corps.

During the War 1914, Captain Paine, promoted to Commodore, was hurled off to Cranwell in Lincolnshire, protesting that he wanted to go to sea and be torpedoed,—and there for the second time he built a gorgeous training establishment in the middle of a desert. This time it was for the R.N.A.S. And in six months he had some 2,000 officers and men at work, and properly housed. And among the ablest of his helpers was the Master of Sempill,—then a Flt. Lieut., R.N.A.S.

Much good was done to the C.F.S. late in 1918 by the famous Jack Scott. He died of pneumonia, while serving in the Air Ministry after the War but his work lived.

When Lieut.-Col. Smith-Barry evolved what was generally regarded as the crazy Gosport system of training, by it quite ordinary people were taught to fly as nobody had ever flown before. After the Armistice the Gosport system was grafted onto the C.F.S., and for a time the C.F.S. became officially No. 1 Flying Instructors' School.

Thanks to the determination of Col. MacEwen, the Commandant at the time, the old name was retained, and the C.F.S. became the Central Flying School for Flying Instructors. Then it was moved to Wittering, in Northamptonshire, but on the edge of Lincolnshire, which is the R.A.Fs. own county, and the only county at present where the R.A.F. is not mis-called.

In Naval Ports the indigenes, accustomed to Naval rank-titles insist on translating Squadron Leaders into Lieutenant Commanders, and Wing Commanders into Commanders, and so on. In Army Areas Squadron Leaders become Majors and Wing Commanders become Lieutenant Colonels and Flight Lieutenants become Captains on the

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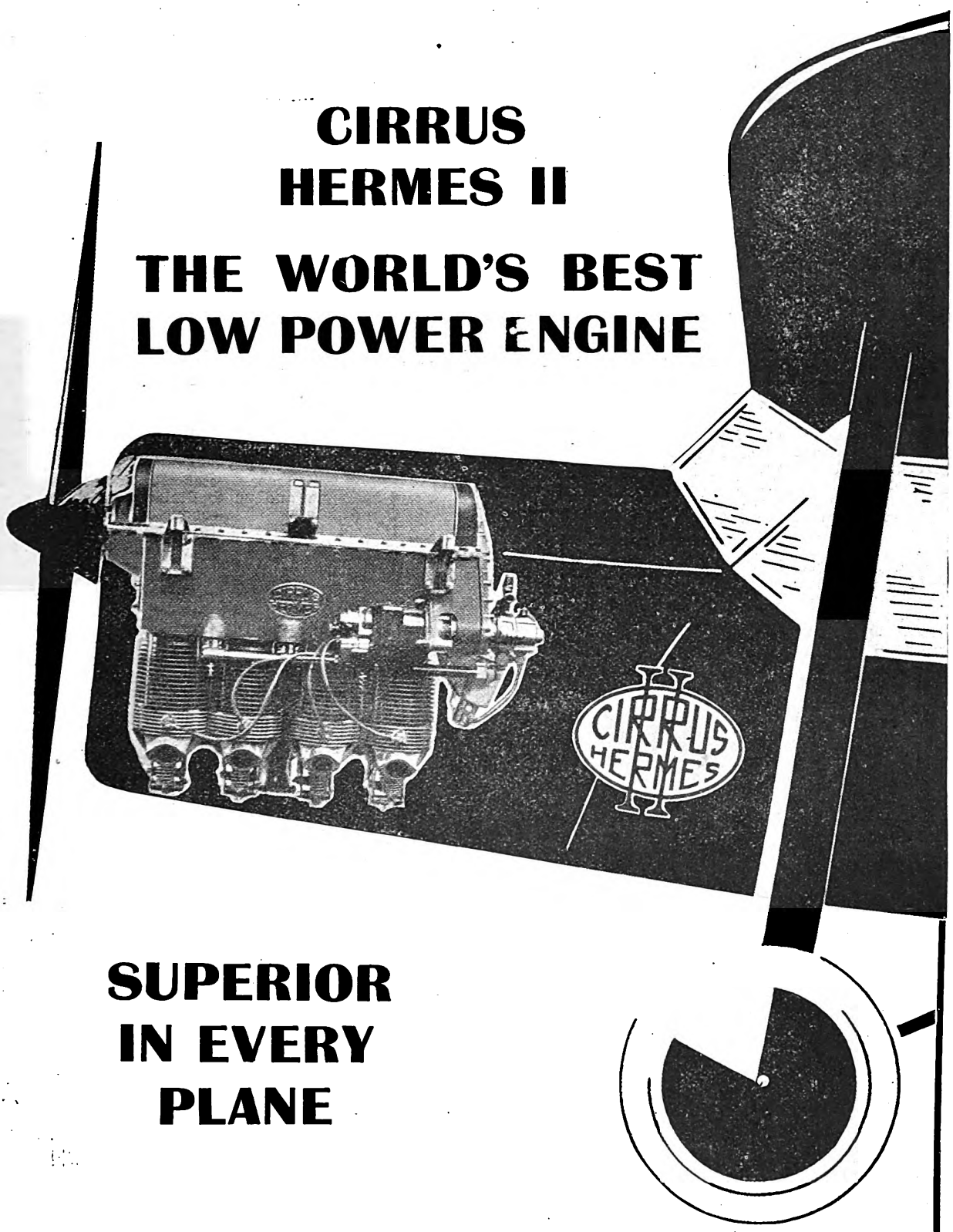


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tongues of the local people,—gentry and peasantry alike. But in Lincolnshire, which is so big that it hardly knows its own distinguished regiment, the people regard the R.A.F. as their own and address them accordingly, whether in the hunting field or in the village shop.

By way of reprisal the R.A.F. in that part of England has commandeered for its own use the best of all march-tunes, "The Lincolnshire Poacher," and marches past to it as an alternative to that medley of Scottish and American musical phrases which is officially "The Air Force March."

Gradually the Air Force is coming into its own. Its rank-titles, which irritated all of us so much when they were invented, are becoming a habit.—And after all they are less foolish than calling the leader of an English Fleet by the Arabic title El Emir (Emir el, Amiral, Admiral), or calling the head of a regiment a Columnel (Colonel) when the heads (the *Caputains*) are under him, or calling a Sergeant-Major General a Major-General when he has a Lieutenant-General over him. We get used to anything in time.

Meantime the C.F.S. at Wittering goes on turning out the finest instructors in the World, against that time when the R.A.F. shall control the next Great War, with the Army on the ground as its holding force and the Navy as its transport service.—C. G. G.

## A DINNER TO COLONEL SEMPILL.

This issue of The Aeroplane went to press on Nov. 18, but, to be properly up to date, we are able to report that on Nov. 18 a dinner was given to Colonel the Master of Sempill, A.F.C., F.R.Ae.S., Past President of the Royal Aeronautical Society, by those members of Council who had served under him during his period of office from 1926-1930. The dinner was held at the Army and Navy Club, in Pall Mall, and was presided over by Mr. C. R. Fairey, M.B.E., F.R.Ae.S., President of the Society.

As is well known, during the years that Colonel the Master of Sempill has been President, the growth of the Society has been most remarkable and the Council unanimously decided to pay him the signal honour of a special dinner on his retirement and at the same time to give him a permanent reminder of their appreciation of his untiring energy and devoted services on behalf of the Society. Colonel the Master of Sempill was presented with a case of cutlery suitably inscribed and engraved.

During the evening many messages were read expressing regret at the retirement of the Master of Sempill. They included messages from the Royal Patrons of the Society. H.R.H. The Prince of Wales and H.R.H. The Duke of York; and also from members of the Society, including Sir Joseph Petavel, Mr. Orville Wright, Lord Wakefield, Major Lester Gardner, Mr. Edward Warner and many others.

Some of these messages were as follows:—

From H.R.H. The Prince of Wales.

I hear that you are on the point of retiring, under the Rules, from the Presidency of the Royal Aeronautical Society. As Patron I have followed with interest the work of the Society during your period of office and know that much of the progress made of late has been due to your constant zeal for the Society's welfare and your energy on its behalf.—(*Signed*) Edward P.

From H.R.H. The Duke if York.

Dear Sempill,—As Patron of the Royal Aeronautical Society, I have learnt with regret of your retirement under the Rules from the Presidency.

I have followed with keen interest the work of the Society during the period you have been President, and I realise that much of the progress which has been made during that period is due to your constant zeal for the Society's welfare and your own untiring energy on its behalf. Yours Sincerely, (*Signed*) Albert.

From Lord Wakefield.

Dear Mr. Fairey,—I am very glad to know that the Members of the Council who have served under him during the past four years are uniting under your Chairmanship to do honour to Colonel the Master of Sempill on his retirement from the Presidency of your historic Society. I have a very great admiration for the Master of Sempill who has done such magnificent work for British Aviation during his career and under whose leadership the Royal Aeronautical Society has added lustre to its already splendid reputation.

At this time in particular we can ill afford to lose the services of anyone who has so much knowledge, skill and enthusiasm as inspires the Master of Sempill. We can, however, be absolutely certain that in many different ways he will continue to help forward the development of flying in England and throughout the Empire, and I will now ask you to allow me to join with you in offering him hearty thanks for the work he has done as President of the Society.

With all good wishes for a very successful period of office,

I am, yours sincerely (*Signed*) Wakefield of Hythe.

From Major Lester Gardner.

Please convey to Council sincere personal regret on occasion retirement Colonel Master of Sempill. His untiring and able efforts have brought new International fame to our distinguished Society all will hope that his energetic ability will always be available and that Dick Fairey may still further increase the world-wide reputation of the Society for service to aeronautics.—Lester Gardner.

From Mr. Edward Warner.

Delighted to have opportunity participating in expression of American members affection for Sempill. I believe Gardner is sending joint message but I want to contribute my personal word of esteem also.—Edward Warner.

From Major B. Baden-Powell (Past President).

May I, as an old member of the Society join in expressing appreciation of the services rendered by the retiring President, Col. the Master of Sempill, during his period of office. I am sure we all realies how very efficiently he has carried out his duties, and how much he has done to enhance the prestige of the Society.

Yours Sincerely,

(*Signed*) B. Baden-Powell.

The following present and past present Members of the Council had promised to attend the Dinner:—Captain P. D. Acland, Prof. L. Bairstow, C.B.E., Major T. M. Barlow, F.R.Ae.S., Mr. L. Bramson, F.R.Ae.S., Mr. Griffith Brewer, F.R.Ae.S., Major J. S. Buchanan, F.R.Ae.S., Major G. P. Bulman, A.F.R.Ae.S., W/C. T. R. Cave-Browne-Cave, Mr. C. R. Fairey, M.B.E., F.R.Ae.S., Captain F. T. Hill, F.R.Ae.S., Captain G. T. R. Hill, M.C., Mr. H. B. Irving, A.F.R.Ae.S., Major D. H. Kennedy, O.B.E., F.R.Ae.S., Capt. A. C. Lamplugh, F.R.Ae.S., Major A. R. Low, F.R.Ae.S., Mr. W. O. Manning, F.R.Ae.S., Major R. H. Mayo, O.B.E., Lt.-Col. M. O'Gorman, C.B., Mr. Handley Page, C.B.E., Captain J. Laurence Pritchard, Mr. F. R. Sims, M.I.Ae.E., Air Vice-Marshal Sir Vyell Vyvyan, K.C.B., D.S.O., Mr. H. T. Vane, Mr. C. C. Walker, F.R.Ae.S., Mr. L. A. Wingfield, M.C., D.F.C., and Mr. R. McKinnon Wood, O.B.E.

## AT THE FORUM CLUB.

On Nov. 9 the Aviation Group of the Forum Club had a very enjoyable evening when Col. The Master of Sempill gave a short talk on his recent voyage to the Baltic in a Puss-Moth. The popularity of aviation in the Club was proven by the number of members who attended.

Col. Sempill described his voyage to Stockholm, a matter of 1,000 miles in the day, alighting in the dark and just missing some mooring stakes by good luck. Thence he flew to Esthonia and up to Finland, which is a dry country, where rum-running is conducted much more amicably than it is in the United States. Afterwards he returned to Sweden, and flew thence across country, by way of lakes and rivers, to Norway.

His last stage was from Norway to Cruden Bay, in Aberdeenshire, over the course flown in the opposite direction by Mr. Tryggve Gran on a Blériot in 1914. He was pleased to report that he defeated the harbourmaster of Aberdeen in an argument about harbour-dues. From Aberdeen he flew non-stop to the Welsh Harp at Hendon, cutting inland on a compass-course from the Wash.

The flight is one of the best lone-hand voyages ever made in a seaplane, and he described it so graphically with the aid of a clever arrangement of maps that, though he had no slides or pictures, everyone had a clear mental picture of it all.

## THE INTERNATIONAL FEDERATION.

The recommendations of the Schneider Committee of the Royal Aero Club regarding the Contest in 1931 have been unanimously approved by the General Committee.

The International Sporting Commission of the F.A.I. will meet in Paris on Saturday, Nov. 29, to examine the refusal by the Royal Aero Club of the entries of the Italian and French Clubs for the Schneider Contest 1931.

The Royal Aero Club's representative on the International Sporting Commission is Lieut.-Col. M. O'Gorman.

A Conference of the F.A.I. will be held in Paris on Monday, Dec. 1, 1930, to elect a President and Vice-Presidents, and the delegates from the Royal Aero Club will be Lieut.-Col. M. O'Gorman, Major C. J. W. Darwin, Captain C. B. Wilson, and H. E. Perrin.

## INTERNATIONAL AIRWORTHINESS.

A meeting opened at the Air Ministry on Nov. 18 at which representatives of France, Italy, Holland, Belgium, Czechoslovakia and Great Britain were present to discuss an international agreement with respect to certificates of airworthiness. The committee was appointed by the Operational and Material Sub-Commission of the International Commission for Air Navigation.

The present practice, by which an aircraft of any country can fly anywhere in any other country with its native certificate of airworthiness so long as its registration is also native, has very unsatisfactory features. Before an aircraft can be registered in a foreign country or legally owned therein a certificate of airworthiness must be issued to it by the authorities of that country. This is always a complicated process and frequently a failure because of slight differences in the requirements. The aim of the present meeting is to arrive at some form of international standard.

Major Buchanan, the British representative, is credited by a daily paper with suggesting that any international regulations on airworthiness should be general rather than particular. Specific provisions for strength, control, fire-protection, etc., must always lag behind the normal progress of commercial development and might have a crippling effect thereon.

## A GOOD CO-OPTION.

Mr. W. Lindsay Everard, M.P., has been co-opted to the vacancy on the Committee of the Royal Aero Club caused by the death of Air Vice-Marshal Sir Sefton Brancker.

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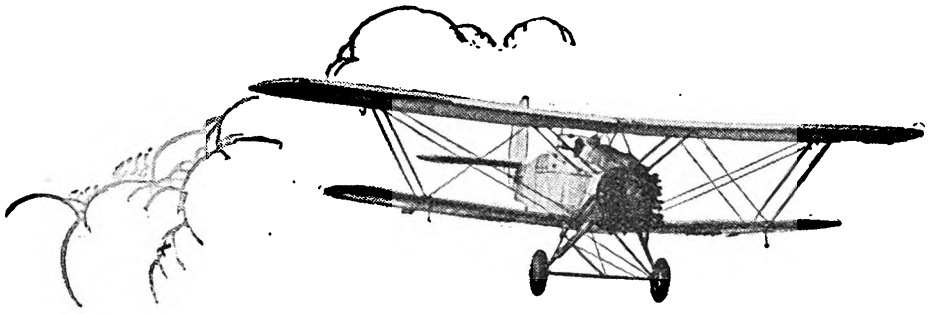

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THE Armstrong Whitworth Steel Atlas fitted with Armstrong Siddeley Jaguar engine is the standard two-seater aircraft for Army co-operation. It is also used for :—

1. Artillery observation
2. Photography
3. Bombing
4. Picking up messages
5. Reconnaissance
6. Advanced training.

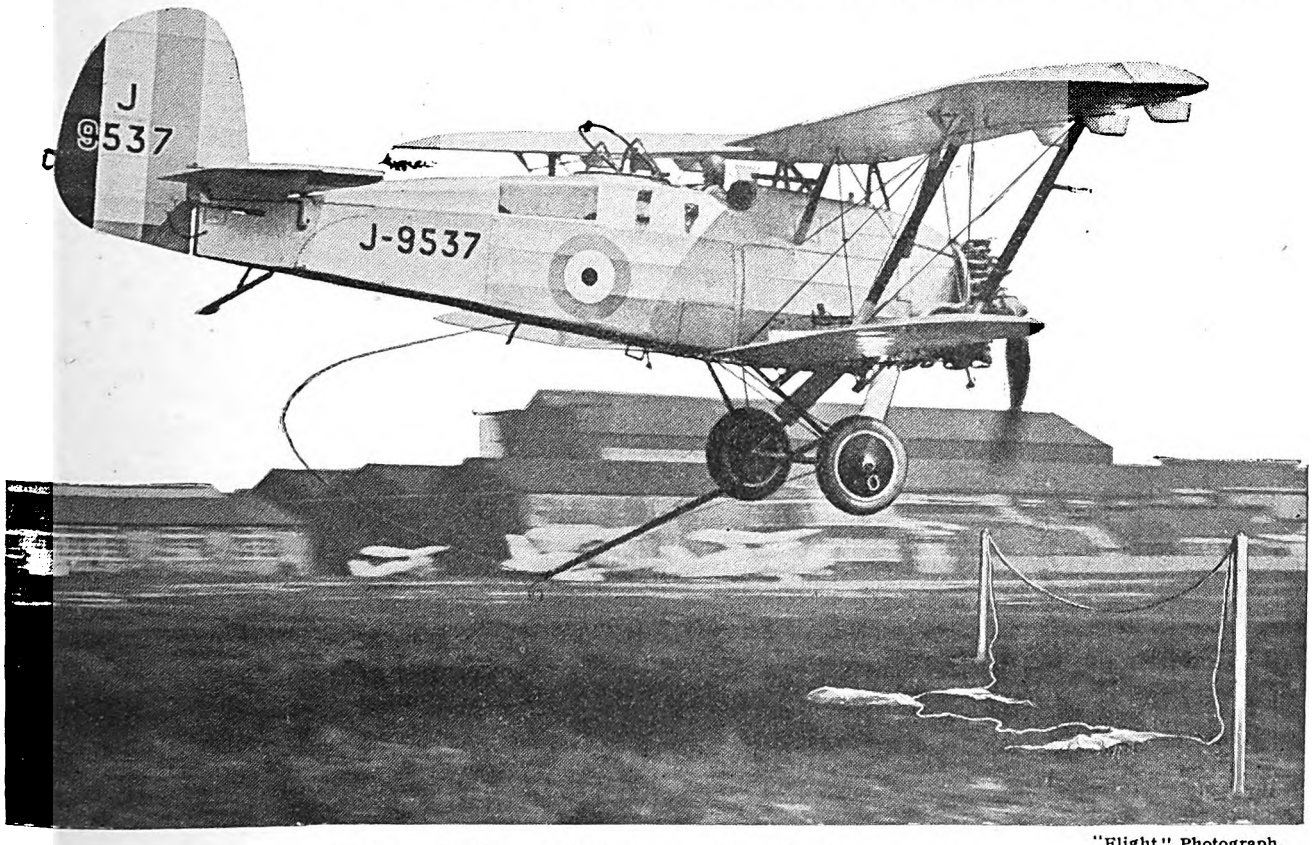
The Atlas aircraft is produced in the best equipped aircraft factory in the British Empire.

SIR W. G.

# ARMSTRONG WHITWORTH

AIRCRAFT LIMITED

Works and Aerodrome: Whitley, Coventry. London : 10, Old Bond Street, W.1.




"Flight" Photograph.

The Atlas Picking Up Messages.



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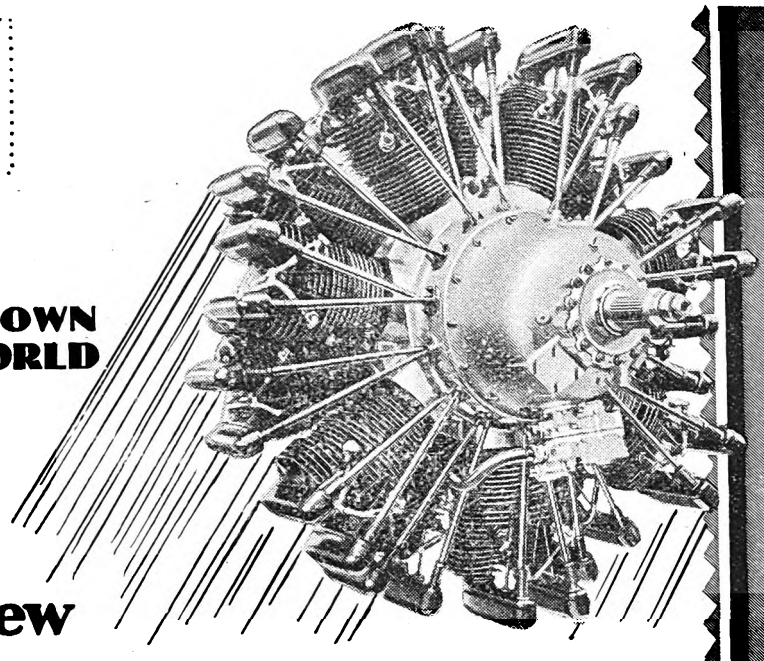
PARIS
AERO SHOW
*Nov. 28—Dec. 14*
STAND 1 GALLERY A



**FLOWN AND KNOWN ALL OVER THE WORLD**

# The New ARMSTRONG SIDDELEY

## JAGUAR MAJOR (GEARED)

THIS geared engine is an improved and more powerful edition of the world famous Jaguar.

Its outstanding qualities are its smooth running and total absence of vibration, ease of installation, simple maintenance and economy of running.

Its performance is equal if not superior to that of any watercooled engine of the same power.

Two types are available. The normal one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the fully supercharged type rated at 510 h.p. at 11,500 feet.

ARMSTRONG SIDDELEY MOTORS LTD., COVENTRY, ENGLAND,
and 10 Old Bond Street, London, W.1.



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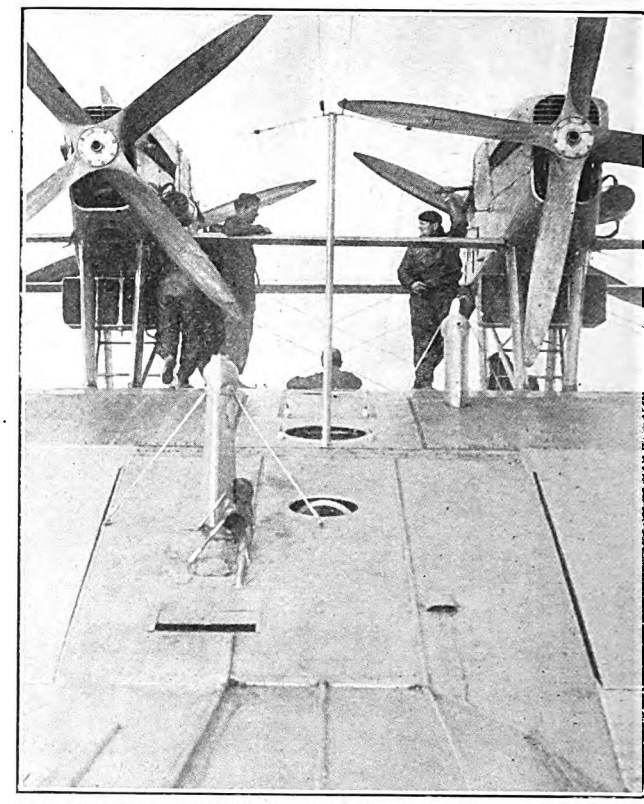
**A ROYAL VISIT.—H.R.H. The Prince of Wales being received by Dr. Dornier.**



**LOOKING FORWARD.—The four middle engines seen from the after hatch.**—(*"Aeroplane" photograph.*)

ceivably move three or four feet over the speed range, which is a big displacement for one man to cope with when the mass of the machine totals 50 tons. Furthermore, the passengers' quarters are unusually spread out along the length of the hull, so the live load is not likely to remain in constant trim.

The unusual balancing vanes mounted above the fixed surfaces, in the style originated by A. V. Roe at Hamble, and connected to the control surfaces by levers, are undoubtedly designed very carefully to even out the loads on the system, but we should be very interested to know how much the Do.X is actually flown on the tail trimming gear.

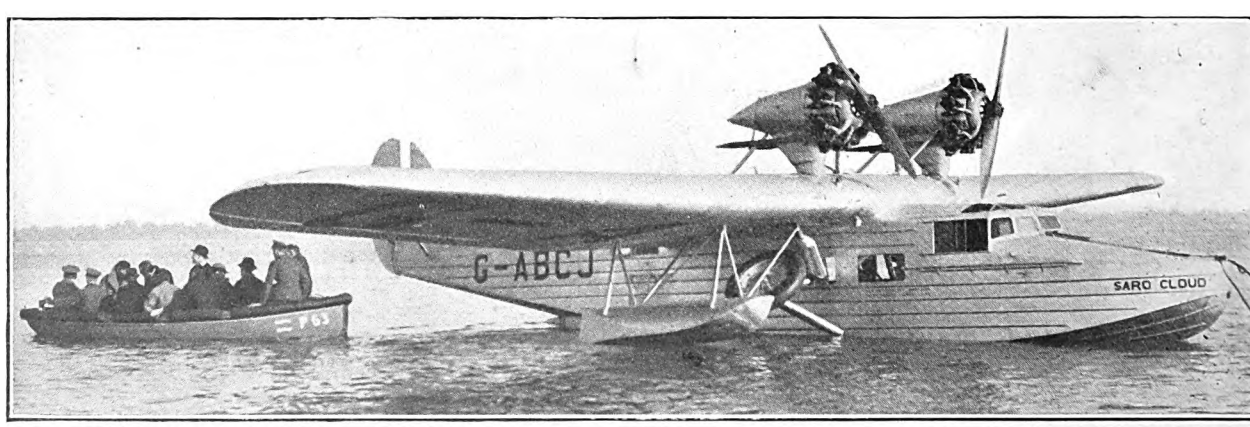
Our leisured speculations during the movie patrol were interrupted by the arrival of a launch from which a party boarded the Do.X. They were Lord and Lady Louis Mountbatten, Sir Philip Sassoon, Mr. A. C. M. Jackaman and a friend or so. Not many minutes afterwards the Saro Cloud loomed up from the East, and the battery commander began issuing firing orders to the camera men on our craft. H.R.H. the Prince of Wales was expected in the Saunders Roe amphibian, which had taken off from Hendon and alighted not far from the object of the Royal visit.

The Prince was taken off the Cloud in a boat which seemed about the size of half an egg, transferred to a craft of nobler dimensions and thence boarded the German visitor. He was welcomed by Dr. Dornier, Captain Christiansen and his officers, while the engineers stood at attention up among the engines.

The get-away was smart in the extreme. Attendant barges and all moorings were cast off and the Do.X taxied away under her four outside engines in a few seconds. The engineers, in leather flying-suits and helmets, worked at the inertia starters and had all twelve engines running before the machine had gone a mile down towards the Solent.

Our movie boat followed as fast as it might, and there was some small conflict amidships between the pictorially-journalistic mind and the marine ditto. The former is notably fond of action regardless of sea lore or marine law, but the coxswain carried on inscrutably sweeping the horizon, or whatever one does in those circumstances, and we followed at a respectful distance. The Do.X circled the lightship eastward and ran up her engines one by one, and while discussion still raged concerning the best position for viewing the take-off Capt. Christiansen turned into wind and roared westward south of Calshot.

The take-off took 35 seconds, which was better than was generally expected, even with a light load. Without climbing very high the machine turned down towards Portsmouth and disappeared for about half an hour. When it




**A ROYAL VISIT.—H.R.H. The Prince of Wales and his party in a much overcrowded boat putting off from the Saro Cloud to visit the Do.X.**

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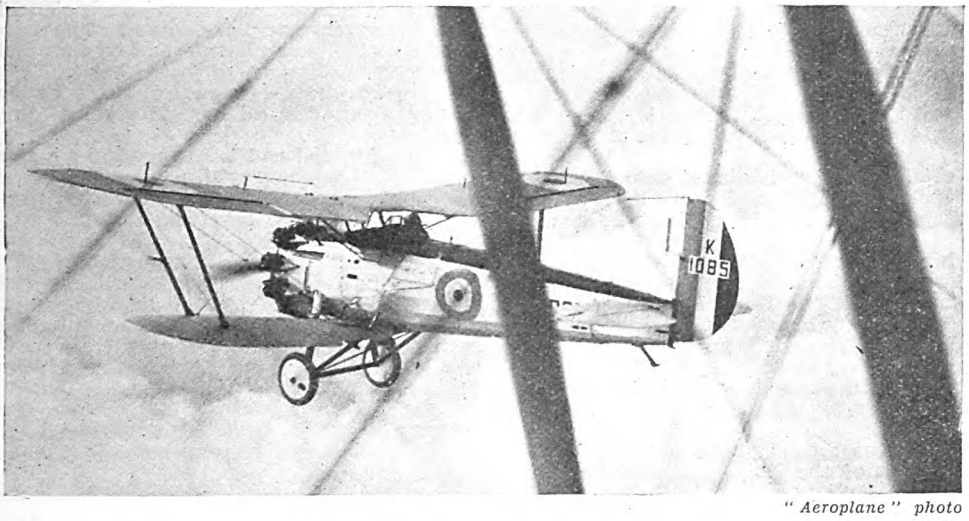
# "Bristol"




"Aeroplane" photo

The merits of the "Bristol" Bulldog All-Steel Single-Seater Fighter are best appreciated by squadrons of the Royal Air Force, the Royal Australian Air Force and the Air Forces of the several other countries which are equipped with Bulldog machines.

THE BRISTOL AEROPLANE CO., LTD.
FILTON — BRISTOL.

*Telegrams: "Aviation, Bristol."* *Telephone: 3906 Bristol*



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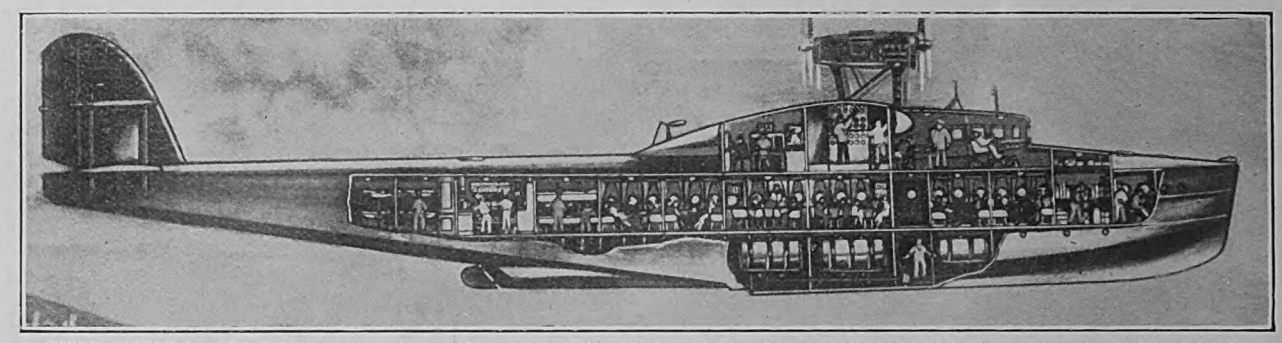


**THE INSIDE OF THE Do.X.—A sectioned sketch of the ship.—Pilots, Captain, Engine-room, and Electrical-room, on top deck. Wireless-room, Store-room, Passenger Cabins, Kitchens, Middle Deck. And Petrol Tanks below, showing Inspector on duty.**

came back it flew over Calshot Castle, where we were by this time, and its appearance was very impressive indeed.

The lines are much more graceful than they appear on the water, which is saying a good deal. A noticeable thing is the very decided blanketing of the clamour of engines as it passes just overhead and the great wing is interposed. The reputed quiet of the cabins probably gains a lot from this.

Capt. Merz, the chief pilot, flew it almost onto the water before throttling back to alight, and made the smooth contact which one expects from a flying-boat in smooth water.

The Prince and his party were soon transferred and disappeared in the Saro Cloud back to London. Incidentally the two flying-boats of which His Royal Highness chose to take the controls on that day both had American engines. The Cloud has two Wright Whirlwinds and the Do.X twelve Curtiss Conquerors. After trying both representative types, the nine-cylinder radial and the water-cooled V twelve, he is now fairly well qualified to comment on their running quality.

The Prince took over the second pilot's controls for ten minutes during the flight of the Do.X, and flew the Saro Cloud for some time on both journeys. With him in the amphibian were Flt. Lt. Fielden, late R.A.F., his personal pilot, Flt. Lt. J. Armour, R.A.F., Mr. R. L. Preston, Coldstream Guards, Mr. Scott, chief test pilot of Saunders Roe Ltd., and Mr. Baker of Airwork Ltd.

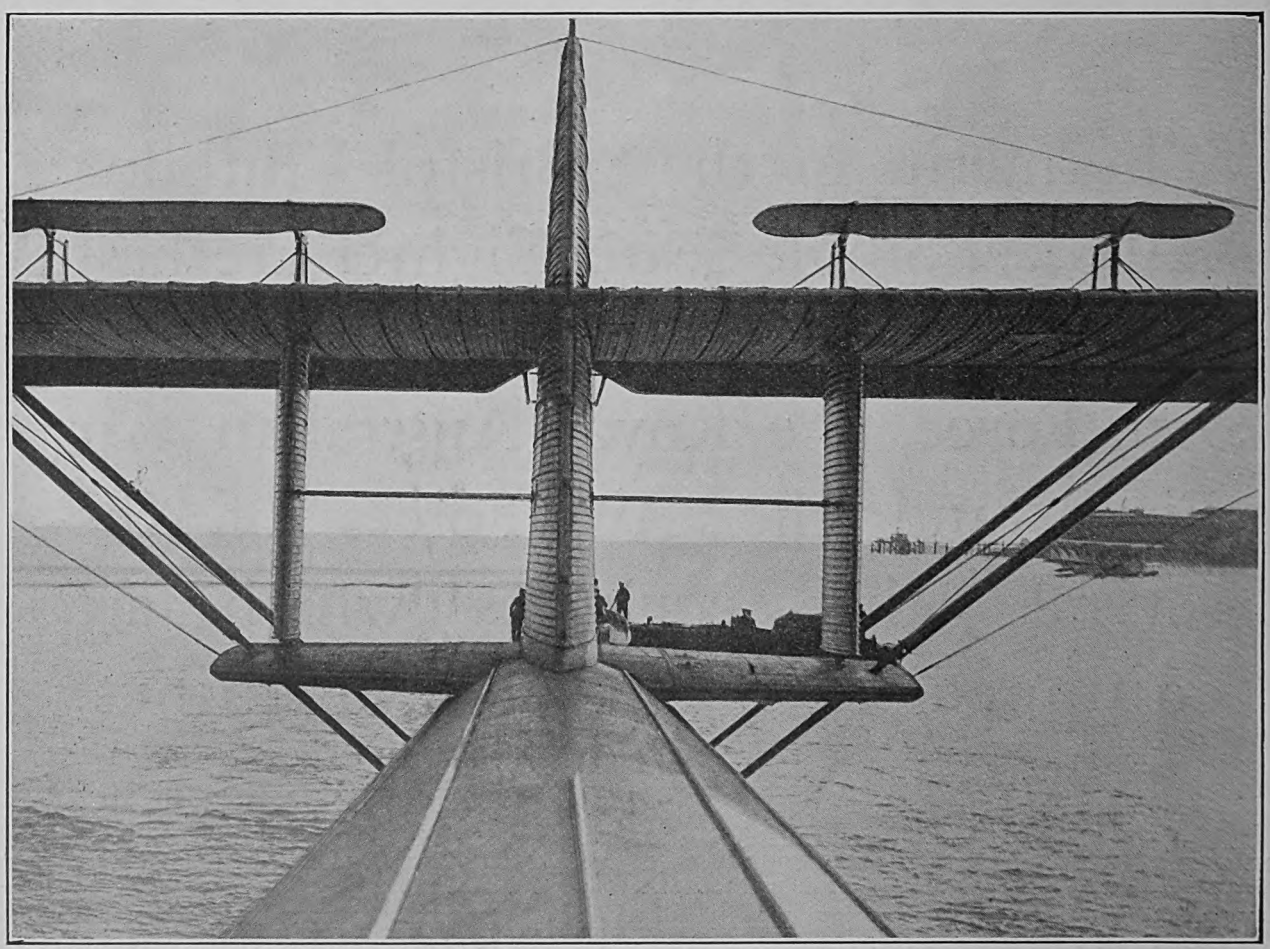
Some time later we went aboard. The inside certainly rather staggers the imagination. The passenger quarters are immensely more roomy and comfortable than those of a train or the largest of motor-'buses. In spite of seating for 74 people there is plenty of space for legs and also for moving about the cabins. The galley and lavatories are in rear.

At the forward end is the navigator's compartment with all the wireless equipment, particularly the directional wireless,—which betrays its existence to the outside world by the large aerial ring which stands up on the nose of the ship.

Up a ladder from the entrance lobby, and through a trap door, is the commander's room with chart tables and telephones. Forward of it, and directly connecting with it by a door, is the pilot's room—it is much too large to be called a cockpit—where two pilots have their chairs and the dual sets of controls. Each pilot has two throttles only, and these are dual in action also, as one controls the starboard six engines and the other the port six. All the flying instruments seem to be duplicated, but we imagined that the engine instruments merely indicate the average revs. of certain groups.

The view is good all round, and the vista ahead, of incredibly long and boat-like bows with dead-heads and hatchways, is more than a little fantastic.

Behind the commander's room we ducked under a cross-member into the engineers' compartment. It is partly in



**LOOKING BACKWARD.—The tail of the Do.X seen from the after hatch. The figures are on a barge aft, and not actually on the tail.**—(*"Aeroplane" photograph.*)

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# THE FOKKER DXVI SINGLE SEAT FIGHTER, FITTED WITH TOWNEND RING

which won the recent Roumanian Military Aircraft Competition, has a *maximum speed at* 15,000 *Ft. of over* 200 *M.P.H.*

**This performance was only possible with the aid of the Townend Ring.**

A suitable Boulton & Paul Townend Ring can be fitted to any aeroplane with Radial Engines, and will lead to a marked increase in speed or to considerable economy in power.

# BOULTON & PAUL Ltd. NORWICH

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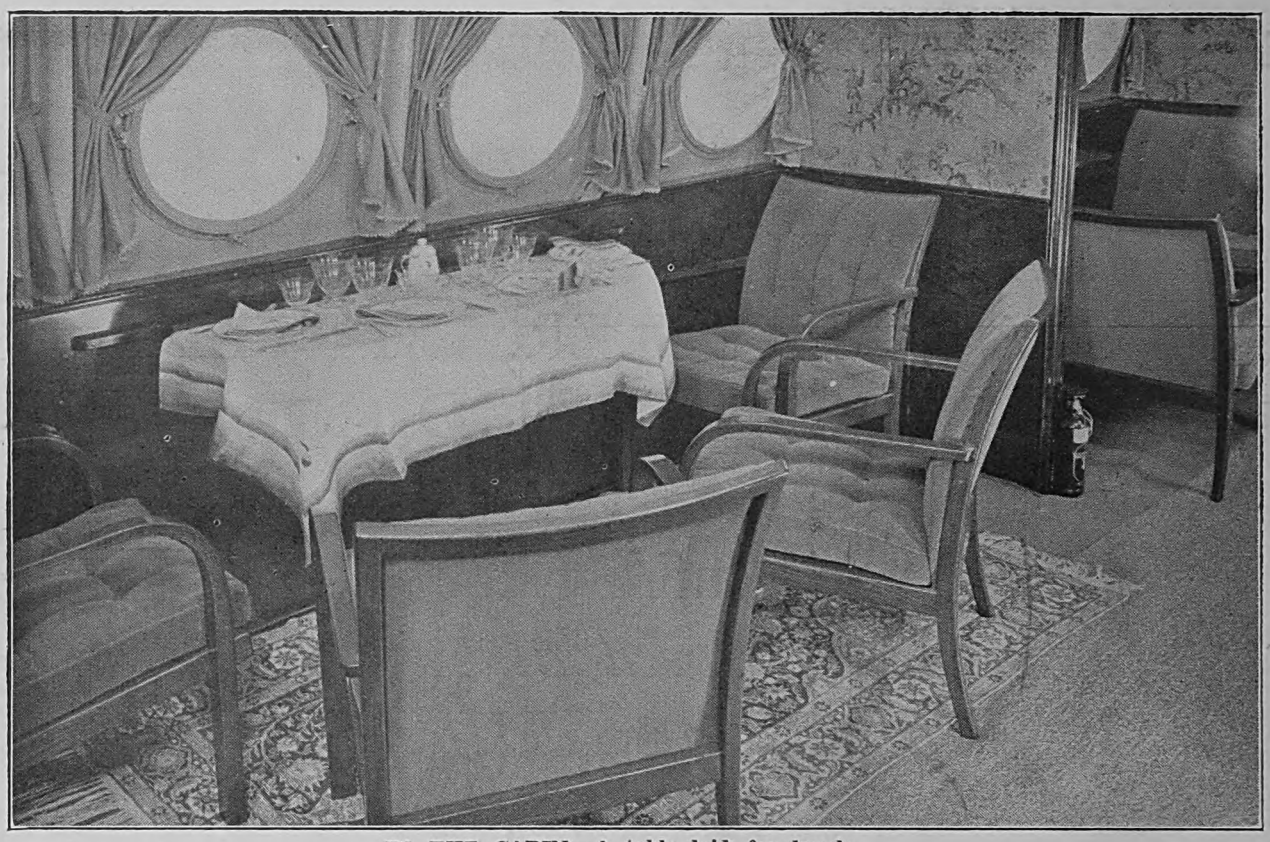


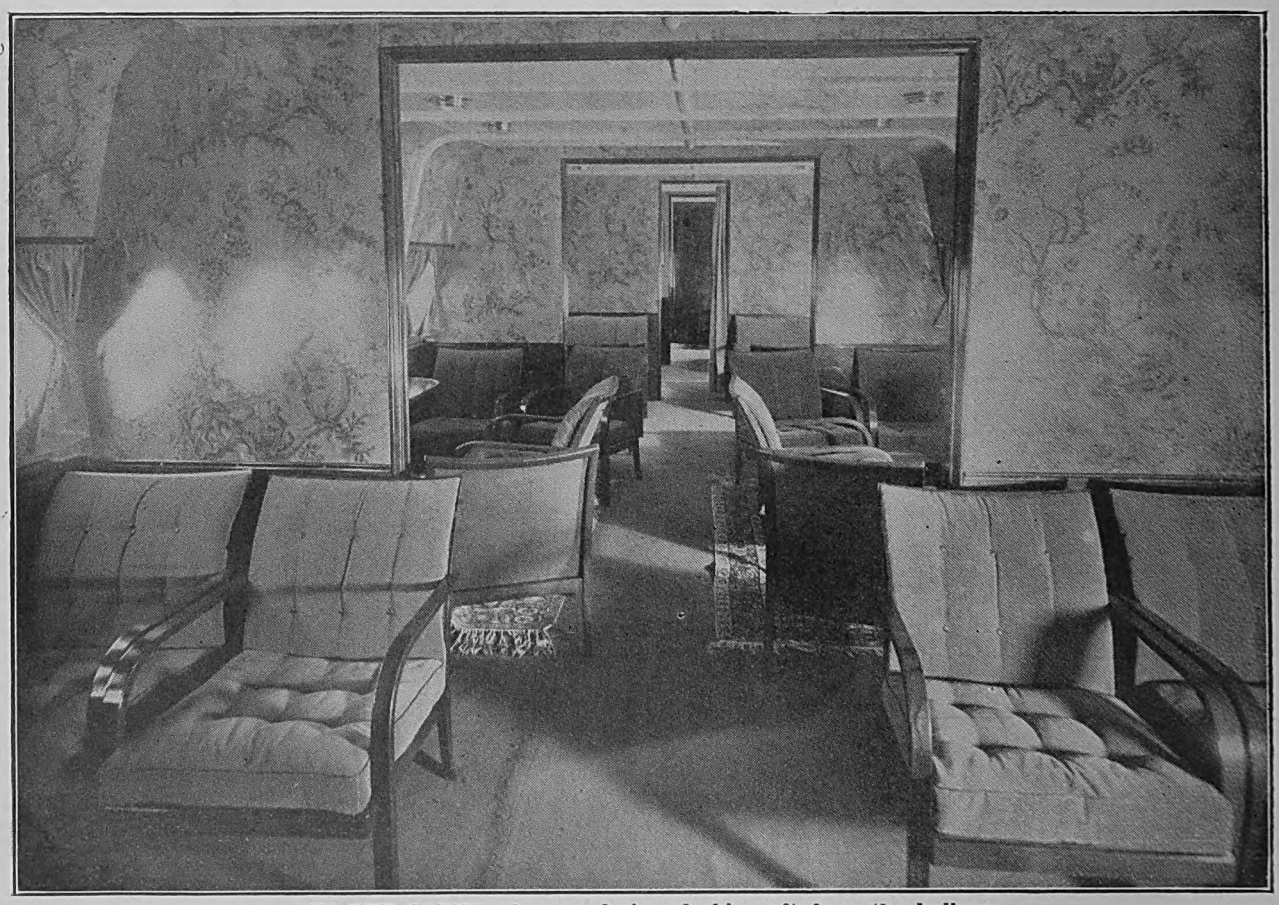
**IN THE CABIN.—A table laid for lunch.**

the thickness of the wing, and passages run along inside the main spar of the wing to give ingress to the engines. Banks of instruments, throttles and mixture-levers protrude from twin boards on either side of the compartment, and each board is the control station for the six engines on that side.

The cables which transmit control movements from the levers, the cables which carry switch circuits, those which house the tachometer gears and the pipes which connect oil-gauges combine to give an unbelievably complicated appearance behind the panels.

We did not stay for a long examination, because the crew were obviously rather wearied with visitors and were anxiously watching the mechanisms in their charge.

Everything in the craft seemed to radiate security and permanence, but it has yet to meet really severe conditions. Whatever the outcome when it does, the Do.X is a most noble experiment.—F. D. B.



**IN THE CABIN.—A general view, looking aft from the hall-way.**

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In a cable from Sydney, Australia,
Major Kingsford-Smith says :——

# "PERFORMANCE OF GIPSY II POSITIVELY ASTOUNDING"

Major Kingsford-Smith used a standard
Gipsy II engine, manufactured by :—

THE DE HAVILLAND AIRCRAFT CO., LTD.,
STAG LANE AERODROME, EDGWARE, MIDDLESEX,
ENGLAND.

*Associated Companies in Australia, Canada, India and South Africa. Licensees, Selling and Service Agents throughout the world.*



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## THE Do.X GOES ON.

The Do.X left Calshot on Friday, Nov. 14, at about midday, after a delay of three or four hours caused by fog on the Solent. Owing to the fog Capt. Biard, of the Supermarine Aviation Works (Vickers Aviation Ltd.), only just caught the Do.X with the help of a speed-boat. And various "me-toos of aviation," as they are called in Australia, missed it. The ship reached La Rochelle that night instead of Bordeaux.

Colonel Sempill returned from La Rochelle by ordinary route on Saturday and gave a most interesting account of the voyage. The cause of the alighting was simply darkness. The start was held up so long by fog that by five o'clock Captain Christiansen came to the conclusion that they would be safer on the water than in the air, as there were no aerial beacons or anything else ahead to help them to a proper alighting in the dark. So, as the coast round La Rochelle is rocky and dangerous, obviously the sensible thing was to do the rest of the journey on the surface. Colonel Sempill said that with four engines running the boat was making a good fifteen knots, so they were better off than the average ocean liner even then.

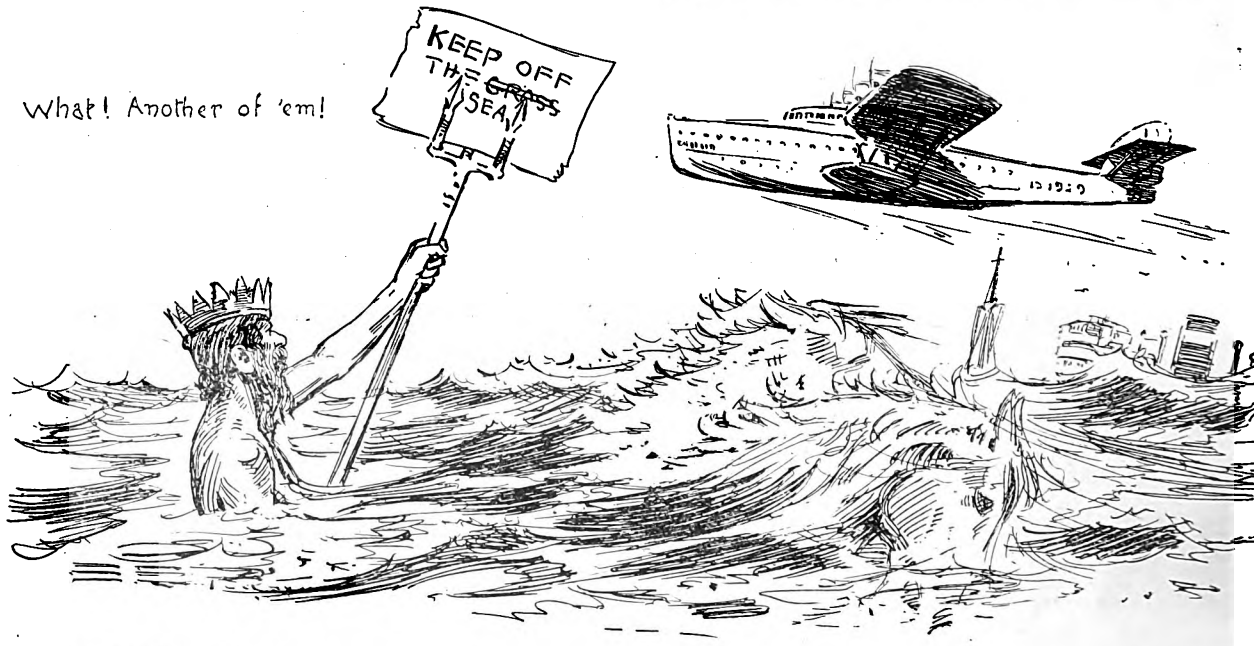
Colonel Sempill flew the boat for a time, and he says that she is extraordinarily light on the controls, both latitudinally and longitudinally. Naturally she answers slowly, as any big machine does, but there is no physical effort about it. The balancing of these vast control-surfaces is certainly one of the finest achievements of the designers of the Do.X. He also remarked on the curious sensation of having thirty feet or so of bow rising and falling in front of one when the elevator is used,—and liked it,—as an indicator of the attitude of the ship to the horizon. It seems preferable to having the pilot in the extreme nose, where he gets all the up and down motion himself. Incidentally, Col. Sempill remarked that all the way across the Channel the German pilot flew the ship about ten feet off the water, so he evidently has perfect confidence in the controls.

The routine of the ship during its voyage is exactly like that of an ocean-going steamer. Colonel Sempill said that to watch the way this is done is a most interesting experience. Just aft of the control-room is the entrance to the main spars, inside each of which is the passage-way to the engines on that side. Here you may see the engine staff watching the temperature and general behaviour of the engines, or lying down inside the spar resting.

Then, at the end of the tunnel made by the spar you see a light moving inquiringly in the interior of the wing. This is the lamp of the inspector, who has been crawling out to the wing-tip to see that the aileron controls are all working properly. Later on, if you go down to the lowest deck, where the petrol-tanks are, you will probably meet him emerging from behind a tank, where he has been inspecting pipe-unions, and such things, or he may crawl into the cabin from the manhole in the stern, where he has been having a look at the tail-controls. All this detail inspection goes on the whole time the machine is in the air or on the water.

By the time you have explored the whole ship in this way, climbing up and down ladders and watching what is going on generally, you find yourself very glad to have a rest in the luxurious seats in the cabin, and you find that the well-equipped galley is by no means there for ornament.

THE SKIPPER.—Captain Christiansen.

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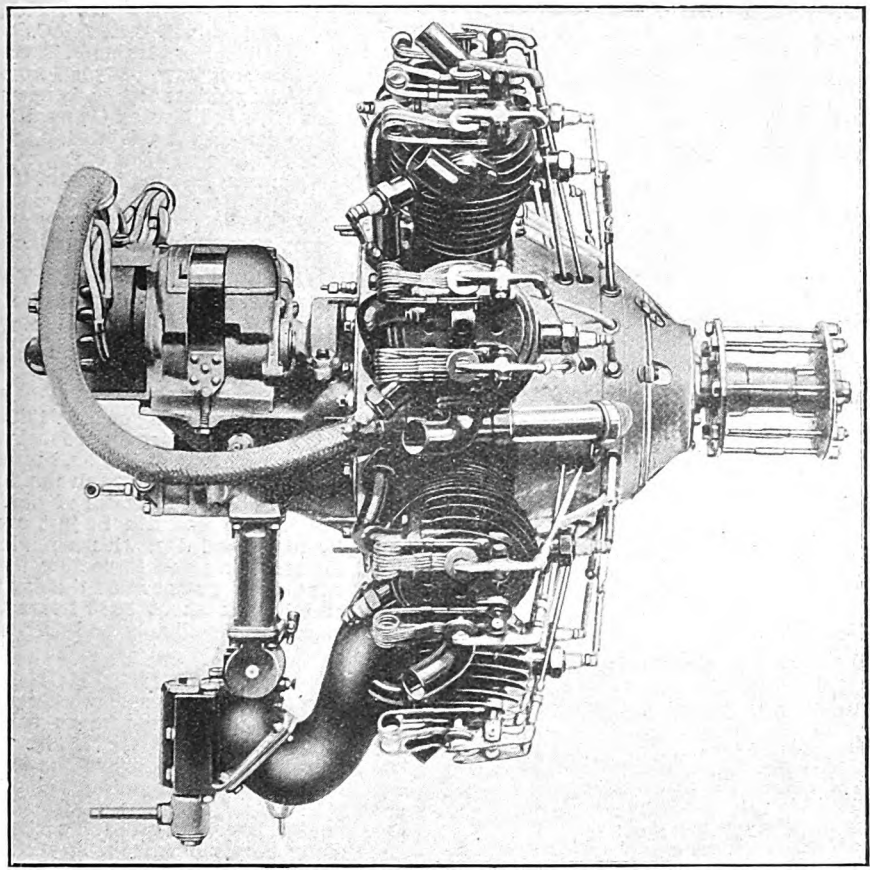
# THE AERO ENGINE OF PROVED RELIABILITY



**Proved reliability is a quality which no other advantages can replace. Be the design never so brilliant, the specification never so attractive, the discriminating buyer still appreciates the essential need for a record of proved service. Such a record is the enviable possession of every engine in the British Salmson range. In some cases five, in other cases seven, years of service in every variety of machine, in every possible climate, have amply proved the fundamental soundness of Salmson design.**

***The British Salmson range comprises the nine cylinder 50 h.p., the seven cylinder 105 h.p. and the nine cylinder 135 h.p., all air-cooled radials.***

# BRITISH SALMSON

**BRITISH SALMSON AERO ENGINES**
**NEW MALDEN, SURREY**

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When the ship arrived at La Rochelle there was a slight mist, which possibly accounted for the fact that no notice was taken of the flash-lamp signals to the harbour. Verey lights were then fired, and presently a tug came along which launched a dinghy, which had apparently not been in the water for months. It leaked like several sieves and was only kept afloat by continual bailing. The passengers were taken off in this dangerous craft and got their legs thoroughly soaked by the gentleman with the bailing can.

All the stories in the Press about the Do.X not being allowed into the harbour of La Rochelle because it is a Naval port are the usual journalistic nonsense. As a matter of fact, those who went ashore landed in the dark on the quay after midnight. There were no Customs or passport officials about and nobody took any notice of them, so they merely went to a hotel for the night. Next morning some of them came home by train, and the rest went back on board.

When the Prefect of La Rochelle learned on Saturday morning of the arrival of the Do.X he went on board and extended a hearty welcome to Dr. Dornier and the crew of the ship to come into La Rochelle, and those who went were received most hospitably.

Besides Colonel Sempill, the ship was flown on her way by Major Gustosa and Major Benta, of the Italian Regia Aeronautica, who will be in charge of Do.X2 and Do.X3, which have been bought by the Italian Government, and by Captain Biard. Mr. Huck, Managing Director of the American Dornier Company, and Mrs. Huck, and Major Kraho, of the Yugo-Slavian Air Force, were also among the passengers.

As the Do.X did not arrive at Bordeaux, a small semi-rigid French airship, the V10, belonging to the French Navy, went out on Friday evening to look for her, and an escape of gas forced it to come down. Fortunately, it reached the coast before it reached the water and alighted in the marshes. The car of the ship was wrecked and the crew of five were slightly injured.

The Do.X continued her voyage to Bordeaux on Saturday, and her future doings will depend on the weather.

The story published in certain English papers on Nov. 18 to the effect that the Atlantic flight of the Do.X will be postponed until eight 900 h.p. Rolls-Royce engines have been fitted in place of the twelve 600 h.p. Curtiss engines, is denied by Rolls-Royce Ltd.

Dr. Dornier sent the following signals from the Do.X after she had left British territorial waters:—

To Commanding Officer, R.A.F. Seaplane Base, Calshot:—

We are very sorry indeed to have to leave Calshot, which we now regard as a second home, and it is impossible to express adequate appreciation of all the kindness that has been shown and assistance given to us by you and the officers, non-commissioned officers, and men under your command.

To the Deputy Director of Civil Aviation:—

Will you allow me to express my gratitude to you and through you to the Air Ministry, and especially those officials concerned with the directorate of Civil Aviation, for all the kindness shown and assistance given in connection with the arrival and stay of the Do.X at Calshot? By your kind co-operation all difficulties were removed in advance. Please accept our warmest thanks.

To Sir Godfrey Thomas, Private Secretary to the Prince of Wales:—

Will you please tender my humble and sincere thanks to his Royal Highness for his gracious telegram? It was a great privilege for all of us to welcome the Prince of Wales on board the Do.X, and we trust that he will honour us on another occasion.

Before leaving, Dr. Dornier sent a very charming letter, written with his own hand, to THE AEROPLANE thanking us for courtesies received. We are still hoping that we deserved his thanks, but we feel that the thanks are due the other way, and we hereby thank him and his crew for the courtesy shown to four members of the staff of THE AEROPLANE who invaded his beautiful ship, and for the knowledge we learned there.

There was one serious complaint about the visit of the Do.X, and that was not in the least the fault of Dr. Dornier or of his officers and men. Many important personages in the Aircraft Industry were invited to visit the ship and duly arrived at Calshot on Wednesday and Thursday. There they were kept waiting in the cold because the people who had issued the invitations had done their staff-work badly.

Admittedly the delay of the visit of the Prince of Wales by fog upset their arrangements, but more people might have been shown round when the Prince's delayed start became known. But the real trouble happened next day, when the Admiral Commanding at Portsmouth (who can have little interest in commercial aircraft) arrived in a destroyer with a large party of friends, including many ladies, who monopolised the Do.X for an hour or more while they satisfied their aimless inquisitiveness, with the result that most of the Trade visitors had to go away to catch trains to distant parts of England without ever going on board at all.—C. G. G.

## CHANGES IN N.F.S. LTD.

Although the changes in the Directorate of National Flying Services Ltd. have been known to the inner circles of Aviation for some time, we have not felt at liberty to publish them until such times as they were duly announced by the Directors themselves. The Directors are now:—

Mr. J. G. Peel, J.P., Chairman.

Mr. C. R. Anson, Vice-Chairman (Mr. Anson is also a Director of E. D. Wynn and Co. Ltd., who have been responsible for all those excellent buildings of uniform type which have been built at Hanworth and at the various club aerodromes which have been taken over by N.F.S. Ltd.).

Mr. W. S. Stephenson, M.C., D.F.C., F.R.S.A., who is also a Director of the Mono-Spar Wing Co. Ltd.

Colonel the Master of Sempill, A.F.C., A.F.R.Ae.S.

Sir Alan J. Cobham, K.B.E., A.F.C.

Sq. Ldr. the Right Honourable F. E. Guest and Lieutenant-Colonel Ivo Edwards have resigned from the Board.

Mr. G. E. F. Boyes, late R.A.F., is now no longer a Director but remains with the firm as General Manager.

There is no doubt that a firm such as N.F.S. Ltd., properly run in a business-like way has vast possibilities in the future, not only as a money-making concern, but as a very powerful factor in the progress of British Aviation. Everybody who is concerned for the good of British Aviation will wish the new Directors success in what must be a very difficult task.

## THE NEXT MEETING OF THE G.A.P.A.N.

The Annual General Meeting of the Guild of Air Pilots and Air Navigators of the British Empire will be held on Monday next, Nov. 24, at 6.30 p.m. at the offices of the Royal Aeronautical Society, 7, Albemarle Street, W.1.

## THE RECORD TO SAIGON.

In the very early morning of Nov. 13 Captain Goulette and M. Lalouette, flying a Farman monoplane with the 230 h.p. Lorraine engine, arrived at Saigon, French Indo-China, after a flight from Paris which took five and a-half days.

As reported in THE AEROPLANE of Nov. 12, they started on Nov. 8 and flew to Calcutta in just over four days, flying practically night and day, with a minimum of time on the ground for refuelling and inspecting their machine.

They left Calcutta at noon on the day they reached it, and landed at Bangkok about 18.00 hours that evening. They took off almost immediately and arrived at Saigon at 05.05 hours next morning.

## THE FLYING MONO-SPAR.

Those thousands of people who were interested in that ingenious mono-spar arrangement patented by Mr. H. J. Stieger and Sq. Ldr. de Haga Haig, which was shown at Olympia in July of last year, will be interested to hear that the first complete aeroplane built under these patents has recently been flown, and has turned out to be quite successful.

One is not at liberty to give full particulars of the machine, but so many people have seen it, and it has been so much talked about, but one is at any rate at liberty to say that it is a side-by-side two-seater cabin monoplane with two Salmson engines, and that it has not only a mono-spar wing but a mono-spar fuselage.

## AN EXPLANATION.

Mr. E. Pierce, of Kenya, in renewing his subscription to THE AEROPLANE, writes:—

I have to be prompt in repeating the order for THE AEROPLANE, because although I appear to be the one who introduced it (and am in consequence expected to be the one to pay for it) I am by no means the only person who reads it. Perhaps the district is getting airminded and who knows what will happen when Imperial Airways get busy.

Which may help to explain the World-wide influence of THE AEROPLANE in spite of the fact that we do not broadcast the paper "on sale or return" to bookstalls, and accept unlimited returns of unsold copies,—as is the custom of papers which have to push their circulation. Our trouble is that the circulation of THE AEROPLANE is already too big for the advertisement revenue which can be got from the still comparatively small Aircraft Industry, and any increase in circulation can only be paid for by lowering the standard of our reading matter, or our printing or our paper.

Readers who want THE AEROPLANE can always get it. And if they find any difficulty they are invited to write to 175, Piccadilly, about it.

## A NON-STOP RECORD.

MM. Boussoutrot and Rossi have made an attempt to break the endurance record for aeroplanes, without refuelling, and have flown a closed circuit at Oran. On the morning of Nov. 17 they had been in the air for 52 hours, which broke the French record set by MM. Drouhin and Landry. The current attempt has been made with the new Blériot *grand raid* monoplane, with a 600 h.p. Hispano Suiza engine. The machine bears a strong outward resemblance to the Fairey long range monoplane.

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# ABYSSINIA TO LONDON by PUSS MOTH

## Record time on GOLDEN SHELL OIL and Shell Petrol

On November 7th, Capt. W. L. Hope arrived at Croydon, having flown from Addis Abbaba, Abyssinia, in five days in a Gipsy III engined Puss Moth. The flight was undertaken at only 24 hours' notice to carry to London photographs of the Coronation.

It was impossible for Capt. Hope to lay down supplies beforehand, but wherever he went he was able to get Golden Shell Oil and Shell Petrol, which he used throughout the 5050 miles journey.

## 5050 MILES IN 5 DAYS

Stuarts




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The Hawker "NORN" Single-seater Fleet Fighter with Rolls-Royce F.12.S. Engine has been selected for F.A.A. equipment—again after extensive competitive trials — further confirmation of the supremacy of Hawker aircraft.

**THE H. G. HAWKER ENGINEERING CO., LTD.,**

***SPECIALISTS IN MILITARY AIRCRAFT,***

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, Nov. 11.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Flg. Off. K. R. Warton (R.A.F.O.), is granted a s.s. comn. as a Plt. Off. on probation with effect from and with seny. of Oct. 28; Lt.-Cdr. E. W. Anstice, R.N., is reattached to the R.A.F. as a Flt. Lt. with effect from Nov. 4, and with seny. of July 1, 1927. The following Plt. Offs. on probation are confirmed in rank:—N. Hill (Oct. 16); D. E. Millson (Oct. 20).

The following Plt. Offs. are promoted to the rank of Flg. Off. (Oct. 13):—W. K. Brett, K. D. Knocker, P. R. May, V. B. Myers, N. C. Singer.

The following are restored to full pay from half pay:—Group Capt. R. E. C. Peirse, D.S.O., A.F.C. (Nov. 7); Flt. Lt. G. R. Beamish (Nov. 1).

Flt. Lt. C. W. Hill is placed on the half-pay list, scale B. (Nov. 11).

Flg. Off. I. B. Beesley relinquishes his s.s. comn on account of ill-health (Nov. 12); Plt. Off. on probation D. B. Smith relinquishes his s.s. comn. on account of ill-health (Nov. 22).

MEDICAL BRANCH.—Flg. Off. N. M. Jerram, M.R.C.S., L.R.C.P., is promoted to the rank of Flt. Lt. (April 2) (substituted for the notification in the *Gazette* of Oct. 24).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Plt. Off. on probation G. J. W. Oddie is confirmed in rank (Oct. 1); Flg. Off. on probation F. W. Hartridge, of the Special Reserve, is confirmed in rank (June 29). The following are transferred from Class A to Class C:—Flt. Lt. A. J. R. Moss (Aug. 9); Flg. Off. F. H. Hannaford (Oct. 14). Flg. Off. L. F. Hooper is transferred from Class AA (il.) to Class C (Oct. 3). Flt. Lt. R. A. Vosper relinquishes his commission on completion of service and is permitted to retain his rank (Sept. 12); Flg. Off. K. R. Warton relinquishes his commission on appointment to a s.s. comn. in the R.A.F. (Oct. 28).

ACCOUNTANT BRANCH.—Flg. Off. F. L. Wood relinquishes his commission on completion of service (Sept. 5).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The Rt. Hon. Sir S. J. G. Hoare, Bt., G.B.E., C.M.G., D.L., J.P., M.P., to be Honorary Air Commodore (Nov. 11).

No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON.—The following to be Plt. Off.:—C. D. Griffiths (Sept. 29).

## Appointments.

*Week ending Nov. 17.*

GENERAL DUTIES BRANCH.—Air Vice-Marshal E. R. Ludlow-Hewitt, C.B., C.M.G., D.S.O., M.C., H.Q., 'Iraq Command, on appointment as Air Officer Commanding, 18/10.

Group Captains E. D. M. Robertson, D.F.C., to Air Ministry, on appointment as Director of Personal Services, 10/11. R. E. C. Peirse, D.S.O., A.F.C., to H.Q., Coastal Area, pending posting to Air Ministry, 7/11.

Wing Commanders E. Osmond, C.B.E., to R.A.F. Depot, Uxbridge, 1/11. W. R. Read, M.C., D.F.C., A.F.C., to Station H.Q., Boscombe Down, to command, 3/11.

Squadron Leaders E. R. Openshaw, to No. 111 Sqdn., Hornchurch, 10/11. F. J. Linnell, O.B.E., to No. 9 Sqdn., Manston, 20/10.

Flight Lieutenants D. S. Allan, to No. 1 School of T.T. (Apprentices), Halton, 1/11. G. H. Vasse, to No. 15 Sqdn., Martlesham Heath, 1/11. G. R. Beamish, to Home Aircraft Depot, Henlow, 1/11. R. L. Edward, to No. 16 Sqdn., Old Sarum, 4/11. J. F. A. Day, A.F.C., to No. 12 Sqdn., Andover, 7/11. C. McM. Laing, M.C., A.F.C., to Station H.Q., Bircham Newton, 4/11. F. C. B. Savile, to No. 7 Sqdn., Worthy Down, 10/11. L. M. Elsworthy, to No. 33 Sqdn., Bicester, 4/11. R. B. Sutherland, D.F.C., to Station H.Q., Boscombe Down, 3/11. D. M. Fleming, to No. 22 Sqdn., Martlesham Heath, 3/11. G. Combe, to Station H.Q., Boscombe Down, 3/11. J. C. E. A. Johnson, to No. 99 Sqdn., Upper Heyford, 7/11. G. J. Southam, to Station H.Q., Boscombe Down, 3/11. J. R. Brown, D.F.C., to No. 7 Sqdn., Worthy Down, 10/11. A. H. Wheeler, to H.Q., 'Iraq Command, 18/10. H. H. V. Tristem, to A. and G. School, Eastchurch, 23/10.

Flying Officers E. H. Irving, to No. 12 Sqdn., Andover, 4/11. J. M. Wells, to Station H.Q., Andover, 4/11. A. M. Butt, to No. 12 Squadron, Andover, 4/11. R. I. Johnson, to No. 10 Sqdn., Upper Heyford, 1/11. R. C. Dawkins, to School of Army Co-operation, Old Sarum, 1/11. F. Miller, to School of Balloon Training, Rolleston Camp, 1/11. A. M. D. Howes, to R.A.F. Base, Gosport, 1/11. G. R. Weighill, to No. 13 Sqdn., Netheravon, 30/10. L. W. C. Bower, to No. 33 Sqdn., Bicester, 4/11.

STORES BRANCH.—Flight Lieutenant J. S. Browne, to Station H.Q., Boscombe Down, 3/11.

Flying Officer J. R. R. Harvey, M.M., to Aircraft Depot, 'Iraq, 20/10.

ACCOUNTANT BRANCH.—Squadron Leader G. N. Simon, to Station H.Q., Manston, 7/11

Flying Officer G. H. White, to No. 84 Sqdn., 'Iraq, 24/10.

DENTAL BRANCH.—Flying Officers S. C. Allen, to Medical Training Depot, Halton, 13/10. F. F. Kennedy, to Medical Training Depot, Halton 15/10, both on appointment to non-permanent commissions.

## Sir Samuel Hoare.

The *London Gazette* of Nov. 11 announces the appointment of the Rt. Hon. Sir Samuel Hoare, G.B.E., C.M.G., D.L., J.P., M.P., formerly Secretary of State for Air, to be Honorary Air Commodore, No. 601 (County of London) (Bomber) Squadron, Auxiliary Air Force.

## Squadron Movements.

The following Squadron movements took place during the month of October.

No. 33 (Bomber) Squadron moved from Eastchurch to Bicester.

No. 100 (Bomber) Squadron moved from Bicester to Donibristle. The movement of No. 100 Squadron brings this Unit into the Coastal Area and would appear to indicate the early departure of No. 36 (Torpedo Bomber) Squadron for Singapore.

No. 36 and No. 100 are the only Regular Squadrons equipped with Hawker Horsleys.

## The West African Flight.

A few details are now available from official sources of the adventures of the West African Flight, R.A.F. which left Khartum on Oct. 14 to fly to Bathurst and back. This flight consists of four Fairey III F's (Napier Lion engine) of No. 47 (Bomber) Squadron under Sq. Ldr. E. L. Howard-Williams, M.C.

On Oct. 22, one of the aeroplanes, piloted by Flg. Off. J. K. Flower with Flt. Sjt. Mill as observer, was forced to land in the bush 30 miles west of Potiskum. The crew were unhurt but the aeroplane was damaged extensively and beyond immediate repair. The pilot sent a runner 100 miles with a report and the crew spent the night under the wings.

Mr. Flower's report was received by the Commanding Officer of the Flight at Kano in the afternoon of Oct. 23 and he decided to take spares to the damaged machine by road that night if possible. The Resident at Kano lent three cars but they were turned back, after travelling 80 miles, by impenetrable swamp.

Sq. Ldr. Howard-Williams therefore decided to fly to the scene of the accident. He left Kano at dawn on the 24th, accompanied by Sjt. Floyd and landed alongside the wreck successfully. During that day the damaged machine was pulled for 30 miles through the bush to Azare and the work of repair began. Mill constructed a new elevator while Floyd fitted a new petrol pump and did the engine repairs. Three natives sewed tears and patches and two others frayed patches. Flower prepared and doped the patches. The doctor at Azare, a cadet and three natives also helped.

While this was going on 300 natives worked on the preparation of an aerodrome. Mill and Floyd worked throughout the night and completed the elevator. Mill then repaired the main planes while Floyd and the doctor assembled the tail units. Flower and the natives were sewing and patching all day. They all ate their meals as they worked to save time. At 16.00 hours the job was finished and after practically emptying the tanks to lighten the machine they took off and reached Kano by dusk. By working day and night for four days the officers and serjeants had completed the work with the valuable assistance of the Resident at Kano and his Staff and the Staff and Executive at Azare.

Another item of interest was that on Nov. 8 at Bathurst the crews stood by their aircraft during a tornado and no damage was sustained.

The start from Bathurst was delayed for four days because Flg. Off. Flower was admitted to hospital with fever, but as he was still unfit for duty at the end of the four days, the Flight continued their journey without him.

The West African Flight arrived at Sokoto on Nov. 13 and at Kano on Nov. 15.

## The R.A.F. Visit to Siam.

Air Marshal Sir Geoffrey Salmond, K.C.B., K.C.M.G., D.S.O., Air Officer Commanding, R.A.F., India, who left New Delhi on Nov. 2 with a party in three Service aeroplanes on an official visit to Siam and Singapore, arrived at Rangoon on the return journey on Nov. 17.

According to *The Times* correspondent in Rangoon, Sir Geoffrey Salmond reported that an aeroplane route between Rangoon and Singapore was feasible but dangerous owing to the mountainous nature of the country and the absence of emergency landing grounds and reliable weather reports. He said that on the other hand, flying-boats could cover the route without difficulty as there were numerous places where they could alight in safety.

## The Instruction of Foreign Officers in the R.A.F.

In the House of Commons on Nov. 12 in reply to a question by Sir N. Grattan-Doyle, the Under Secretary of State for Air said that there were 37 foreign officers at

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present receiving instruction in R.A.F. establishments. The countries from which they came were:—

Belgium 1: Chile 1: Egypt 7: Esthonia 1: Greece 6: Iraq 14: Japan 2: Latvia 1: Mexico 1: Siam 2: Sweden 1.

**Re-fuelling "Miss Columbia."**

In the House of Commons on Nov. 12, in reply to a question by Capt. H. Balfour, the Under-Secretary of State for Air said that he was aware that a R.A.F. flying-boat had proceeded from Mount Batten to the Scilly Isles for the purpose of transporting petrol to the aeroplane *Miss Columbia* on its recent trans-Atlantic flight. The cost of the petrol had since been refunded to the Air Ministry. No special expenditure had been incurred as the flying-boat was, in any case, due for a navigational exercise that day, and the opportunity had been taken to carry out some photographic work at Penzance and the Scilly Islands.

[A weak excuse. Is a destroyer sent to refuel every yacht whose fool skipper runs out of oil or coal. Or is an Army motor-car supposed to go out of its way to repair cracked-up private cars? An interesting point in this affair is whether the O.C. Mount Batten turned his command into a first-aid for fatuous aviators on his own account, or whether he received orders from the Air Ministry to do so, and if so by what particular political pull His Majesty's Service was obliged to take part in this silly stunt,—which is rather worse than the infamous case of a Yankee film being escorted through the streets by a detachment of the Territorial Army.—C. G. G.]

**Sea-Going Aeroplanes.**

In the House of Commons on Nov. 12, in reply to a question by Sir Rennell Rodd, the Under Secretary of State for Air said that a life-saving collapsible dinghy which could be very rapidly inflated by mechanical means, had recently been subjected to practical tests with satisfactory results and would be carried by all sea-going aeroplanes which were large enough to be so equipped. He had been advised that the re-introduction of wooden construction would be a somewhat retrograde step; but action was being taken to improve the buoyancy of all aircraft operating from aircraft carriers, and all-metal sea-going aircraft at least up to the standard—two or three hours buoyancy—mentioned in the question, Replying to a further question by Major Ross, Mr. Montague said that he did not think that it was a fact that owing to the introduction of the all-metal aeroplane, it had been necessary to restrict the distance an aeroplane could fly from its carrier very considerably. The whole question was a matter of experiment and consideration.

**The Fleet Air Arm.**

The H. C. Hawker Engineering Co. Ltd. has been given a production order for a number of single-seat fleet fighters for Fleet Air Arm equipment.

The machine chosen is the special Fleet version of the Hawker Fury (*née* Hornet) which is already in production as an intercepter fighter for the Royal Air Force. The Fleet Air Arm version, in accordance with the latest method of naming service aircraft, has been named the Norn.

The Hawker Norn is almost identical to the Fury, both of which types have the Rolls Royce F. XII S supercharged engine. The Norn however is specially developed for operation from aircraft carriers and warships generally and is strengthened up to withstand catapult launching. The wheel undercarriage is also interchangeable with floats, and a more comprehensive military load which includes full wireless equipment, is provided for.

The Hawker Company deserve every congratulation on the success of the Hornet type. For both the Intercepter Fighter and the Fleet Fighter classes the Hornet was submitted to extensive trials in competition with several other very formidable types and that the one basic model should be applicable to two Fighter classes, which differ quite considerably in the requirements of the R.A.F. and the Fleet Air Arm, is further confirmation of the quality of Hawker aircraft, which has already been demonstrated in the remarkable success of the Hawker Hart two-seat bomber.

According to the new R.A.F. nomenclature service aeroplanes are now divided into classes according to their main service function and to each class is allotted a distinctive letter of the alphabet which must be the initial letter of the selected name.

Thus all land fighters must have names beginning with "F," (Hawker Fury) all fleet fighters with names beginning with "N" (Hawker Norn), all single-engined bombers with "P," all troop carriers with "C" and so on.

**R.A.F. Communications.**

A de Havilland Puss Moth has been supplied to the Air Ministry for trial by the Royal Air Force for communication purposes.

The value of a fast and economical cabin aeroplane for the transport of senior officers without their having to resort to flying clothing is as obvious as the value, even in time of war, of the Staff car with a saloon body familiarly known as the "Gin Palace." The only previous instance of an enclosed machine being used in this way before was in 1919 when a D.H.4 was fitted with an enclosed cabin for transporting politicians and senior officers of the Services between London and Paris during the Peace Conference. This wolf in sheep's clothing was frequently attacked in the neighbourhood of R.A.F. aerodromes by light-hearted Service pilots who, on approaching near enough to observe the distinguished occupants, departed with all possible speed on more lawful occasions.

The use of the Puss Moth for visits to Service aerodromes by senior officers will also prevent possible harsh criticism by the duty officer at the aerodrome of the landing of the aircraft by a pilot disgused in flying kit who may not be of as junior rank as he appears.

**Rugby Football.**

The Royal Air Force College, Cranwell, defeated the Royal Military Academy, Woolwich, at Woolwich on Nov. 15 by a try (3 points) to nil. By this victory Cranwell has, for the second time in its history, beaten both Woolwich and Sandhurst in the same season. Cranwell were faced with a stiff proposition in their Woolwich match. They were against a heavier team and on a ground which drops twelve feet between one goal and the other. Also, to a team accustomed to the light quick-drying soil of Cranwell, the heavy clay soaked with rain at Woolwich must have made very heavy going. Fortunately the R.A.F. is used to adjusting itself to changing circumstances and its Cadets faced their ancient enemy undismayed.

In spite of the appalling weather a large number of the Staff at Cranwell and of Old Cranwellians turned up to support their team and even if they were slightly outnumbered by supporters of the "Shop" they were not outshouted.

Cranwell took off down hill and, ten minutes from the start, quick heeling by the Cranwell forwards and clean passing among the backs sent them over near the flag on the right wing for a try. The goal kick, with a ball which had the lift and gliding angle of a lump of clay, fell short. This was to be the last score of a game which was, however, full of incident.

Skilful co-operation between the backs gave Cranwell the advantage they lost by the greater weight of the Woolwich pack and the battle raged near the half-way line. The Shop full-back fielded a Cranwell free-kick and found touch well down the line, but Cranwell drove them back, a few inches at a time. A Cranwell forward with the ball at his feet went nearly down to the Woolwich line before he was tackled. The slippery ball was lost in the subsequent scramble in front of the goal and the Shop recovered their lost ground.

Two more Cranwell attacks were held up by free kicks to Woolwich but a further thrust by the Cranwell threequarters went within a few feet of the Woolwich line. Rain had been falling from the start and by this time nobody could hold the ball and hardly any of them could keep on their feet. Cranwell were showing speed and enterprise in attack and a stubborn courage in defence.

The second half was an epic of unskilled but gallant Rugger. Both sides were so coated with Woolwich mud that the spectators could not distinguish one from the other by their colours. The Woolwich backs made several attempts to drop a goal, a mistaken tactic which may have cost them the game. The ball in each case only rose a few inches. Cranwell, hard pressed, were forced to touch down twice and for ten agonising minutes there were scrummages and line-outs dangerously near the Cranwell line.

Cranwell got away at last with a magnificent break but were penalised a few minutes later for feet up in a scrum in front of their own goal. The Shop's kick at goal failed. A great run down the wing by a Woolwich threequarter followed but he was hurled into touch near the flag and the fight for the Cranwell line began all over again.

Cranwell touched down twice before Windsor got the ball and broke through the Woolwich backs with a fine dash half the length of the field. A dangerous Shop attack broke down on their left wing and the game ended in the Woolwich half.

The teams were:—Cranwell: *Full-back*, Chesterman; *Threequarters*, Parselle, Leigh, Windsor and Doran; *Halves*, Rhys and Elsner; *Forwards*, Reed, Addenbrooke, Daubeney, McNair, Empson, Collyns, Coslett and Oliver.

Woolwich: *Full-back*, Loveluck; *Threequarters*, Cole, Farquar, Sykes and Dumbell; *Halves*, Warlow-Harry and Orgill; *Forwards*, Hobbs, Sumner, Sayers, Winchester, Walford, Russell, Pender-Cudlip and Baker.—C. M. McA.

## THE HEJAZ AIR FORCE.

The following interesting letter has been received:—

With reference to the paragraph headed "A Flight to Koweit" in your issue of Sept. 17 last, may I offer the following as a suggested solution to the problem? On Sept. 9, four Westland Wapiti aeroplanes certainly left Amman, not to fly to Koweit, but to continue their journey in the opposite direction. They were four aeroplanes which had left Darin near El Katif, on the Persian Gulf, a little while previously on their way to Jeddah and formed a portion of the Air Force of H.M. King Abdul Ibn Sa'oud, King of Hejaz, Nejd, and its Dependencies.

Under special arrangements with the British Government the trip was made by way of Koweit, Basrah, Baghdad, Rutbah, Amman, Ma'an, Wejh, and Yenbo, and was the result of the Hejaz Government's decision to station their Air Force permanently in Jeddah where they propose to form a flying school and the nucleus of a flying service which is to be staffed largely by Arabs.

The flight covered, roughly, 2,000 miles and no trouble of any kind was experienced. A few days after their arrival in Jeddah, three of the machines flew to Taif, the present seat of the Government, where the British pilots were received and congratulated by the King. Here they gave "joy-rides" to the King's sons, after which the machines returned to Jeddah.

Observer.

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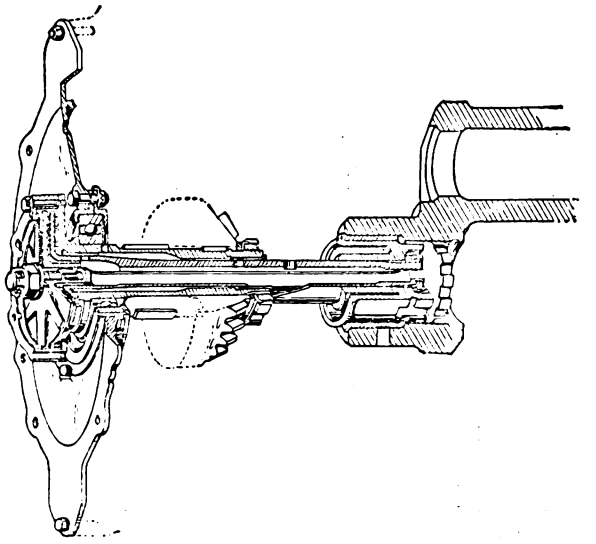

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## THE AIR CONTROL OF ADEN.

A Lecture on the Work of the Royal Force in Aden was given by Squadron Leader the Hon. R. A. Cochrane, A.F.C., R.A.F., *p.s.a.* at the Royal United Service Institution, on Nov. 12.

Field Marshal Sir Claud W. Jacob, G.C.B., G.C.S.I., K.C.MG., was in the Chair.

Squadron Leader Cochrane opened his Lecture by recalling that in April, 1928 the defence of Aden was transferred from the War Office to the Air Ministry and pointed out that although the defence of a Port entailed responsibility for protection against aggression by land, sea, and air, his lecture would only deal with the protection of Aden against aggression by land.

The Lecturer gave a brief history of Aden from the time of its occupation by the British in 1839. He outlined the form of Protectorate treaties and the growth of a land frontier. These earlier treaties with the tribesmen had been merely expressions of mutual friendship but later they had been based on an undertaking by the British to protect their interests and by the tribesmen to refrain from hostile action and to protect the trade routes.

A cardinal factor of our policy had been that the administration of their own affairs was to be left entirely in the hands of the Chiefs. Difficulties with Turkey with diplomatic complications in Constantinople had culminated in the formation of an Anglo-Turkish boundary in 1903. For three years after this a British garrison of 2,000 men had been maintained at Dala, but in 1907 for reasons of economy and to reduce our commitments these forces had been withdrawn.

In 1919 the Imam Yahya of Yemen, the personal ruler of a religious sect of Zeidis and a country the size of England with a population of two million, had claimed the Protectorate and crossed the border and seized Dala. The other tribes called for the protection that we were unable to give. In 1927 the Yemen forces were only forty miles from Aden and the tribesmen were getting restless.

At that time the British forces at Aden consisted of one British and one Indian Battalion, a troop of Cavalry and one Flight, R.A.F. The cost of reinforcements to protect the frontier would be prohibitive and our prestige was at a low level. The decision was then made to reorganise the Aden garrison. A Squadron of the R.A.F. and a Section of Armoured Cars were sent there and a small company of Native Levies was raised. The Indian Battalion left in 1928 and the British Battalion in 1929.

Early in 1928 the Imam had captured two Sheiks who were under our protection. Air action had been taken against him and he had returned the two Sheiks. The Imam forces at this time consisted of 6,000 Infantry and about 30 effective pieces of artillery. They had been trained by Turkish ex-officers and N.C.O.'s. In addition he had an irregular force of about 10,000 among whom arms and ammunition had been distributed. Communications between his principal towns in the Yemen were maintained by telegraph and wireless telegraphy and by four aeroplanes.

The British had a Squadron of 12 aeroplanes. Our object was to force the Imam to evacuate Dala and retire behind the frontier. The Zeidis were in stone forts with dugouts inside the walls. On June 8 pamphlets were dropped on all the principal cities demanding the evacuation of Dala.

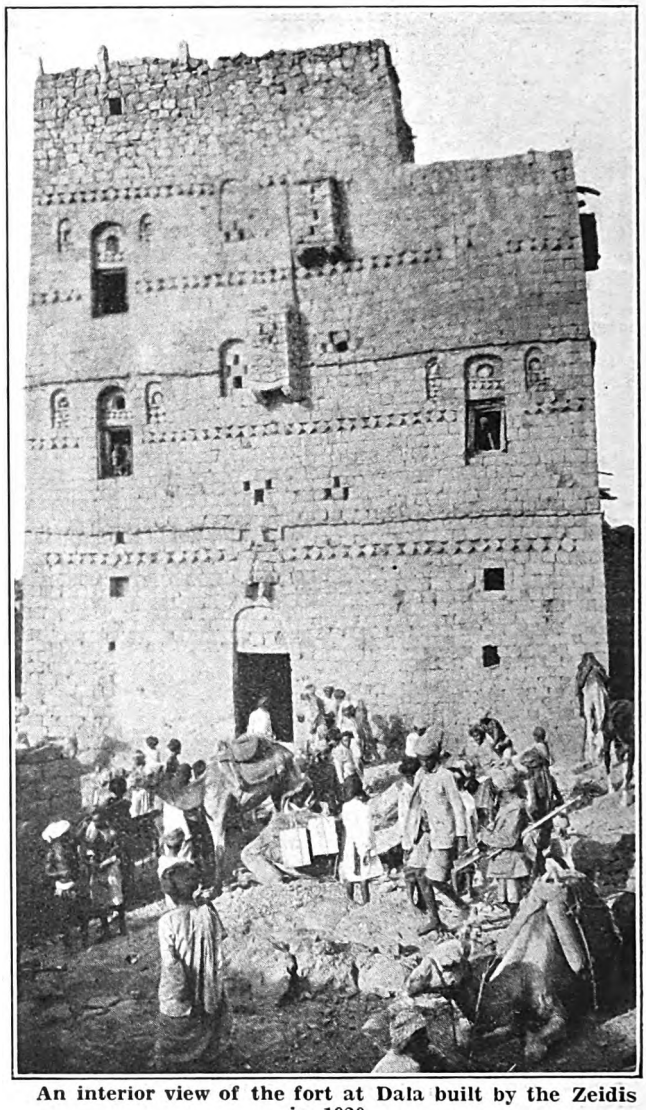
This ultimatum was disregarded and two strongly fortified garrison towns were bombed from the air. Both these towns had anti-aircraft pom-poms mounted. The result of the first week's bombing was that the threatened advance did not take place because the whole of the Yemen's time was taken up in building dugouts. The effect on tribesmen friendly to us was so good that they fought and won a battle.

Squadron Leader Cochrane then showed some remarkably fine slides of photographs taken from the air during these operations showing the result of air action against these fortified towns. Some of them contain stone houses six or seven stories high of solid stone. Bombs could be seen bursting on gate houses and on the centres of water supply and on grain and forage stores.

The fort at Dala which was built of rough-hewn stone by the Imam in 1920 was practically impregnable, but the moral effect on the garrison was devastating as the result of living crouched in dugouts for days on end. Eventually the garrison escaped through an underground tunnel and took cover under overhanging cliffs. Here they were immune from bombing but were caught by machine-gun fire from the air.

A landing ground was constructed at Dala and in spite of the fact that their villages had been bombed during the Zeidi ocupation, the villagers on the Dala plateau welcomed the R.A.F.

An attempt was made by the Imam to recapture Dala with a force of 500 but a report to Aden by W/T brought the R.A.F. in 1½ hours and the Imam's forces were scattered and withdrew. The Imam then gave orders that his commands were not to raid across the borders.



An interior view of the fort at Dala built by the Zeidis in 1920.

The British casualties attributable to the operations were one officer killed and one aircraft destroyed by being forced down in a sandstorm. No more flying was done than would have been done in the course of ordinary peace-time training, and therefore the total cost of the operations was £8,500,—the cost of the bombs and ammunition.

The weather conditions were bad and the targets were restricted. The enemy had good dugouts and plenty of cover against bombing but on the other hand the enemy could not stop the aeroplanes and could not hit back at them. The result was that air operations had established military ascendancy on the frontier on a satisfactory basis.

Squadron Leader Cochrane then discussed the operations of 1929. The Suhebis, a large and predatory tribe, somewhat resembling Pathans in their characteristics, had for some years been in receipt of a system of payments as a guarantee for their good behaviour. When these payments were stopped the tribe raided the fertile district of Lahej and stole cattle and destroyed property. The Suhebis were warned of impending action and retired into the mountains with their flocks.

Bombing started on Jan. 30 and continued until March 5. Small incendiary bombs only were used and the result was the destruction of grain and fodder. By March 27 all the Chiefs had come in and full compensation had been paid. Thus success was completely and cheaply won after the tribe had been a thorn in the flesh of the Authorities for 50 years.

In conclusion Squadron Leader Cochrane said that since the spring of 1929 the work of the R.A.F. in the Aden Protectorate had been that of ordinary routine peace-time control. Landing grounds had been constructed near all the principal villages at a cost of less than £500, with the result that Political Officers were able to visit all over the country in a matter of hours where weeks would have been taken by any other method of travel

Contact had been established with distant tribes, one of which had not previously been visited for 27 years. Re-

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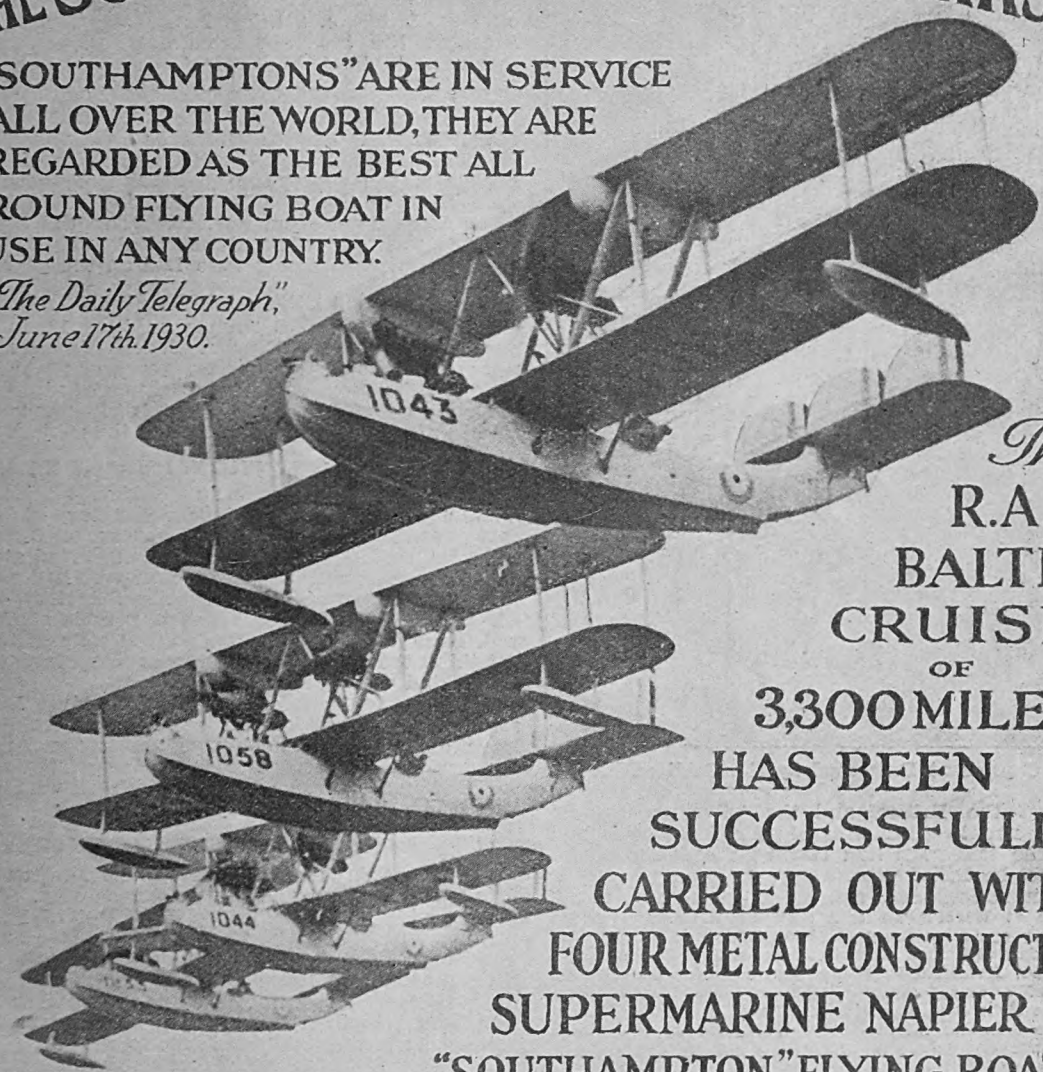
*"The Daily Telegraph", June 17th. 1930.*

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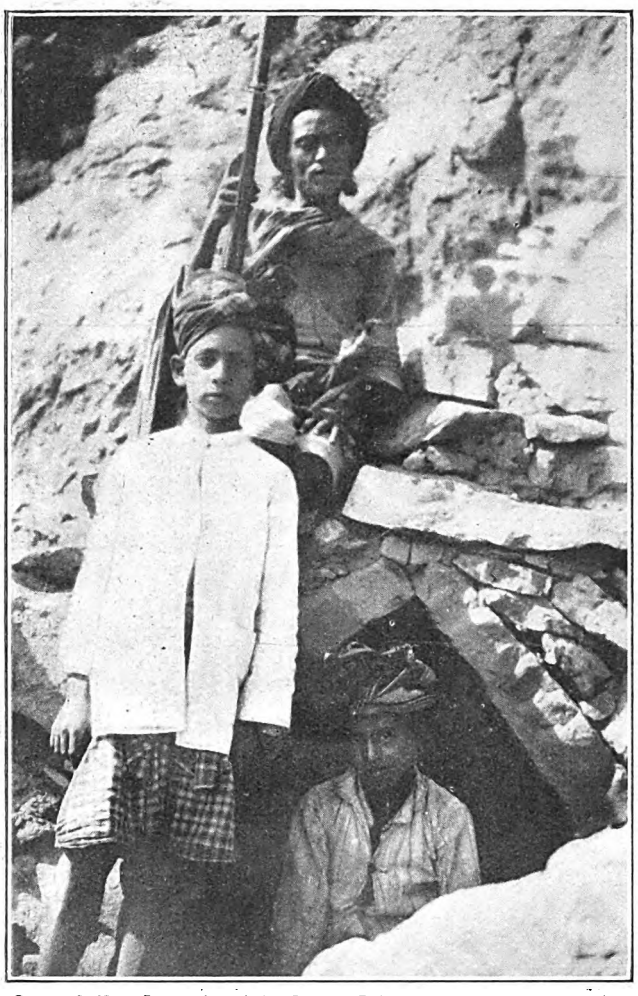

**One of the dugouts at Dala used by the Zeidi soldiers.**

lations between the British and the tribesmen showed marked improvement. Defiance of law and order had stopped and the tribesmen had learned that Government orders could not be trifled with.

Colonel L. H. R. Pope-Hennessy, C.B., D.S.O. (until recently British Military Attaché at Washington) said that the R.A.F. had yet to prove its efficiency against a naval attack and landing. Comparing the defence of Aden with that of Hawaii he said that the latter had twenty submarines, fortifications, 16-ins. guns mounted on railways, coast artillery of a very formidable type, a Division of Infantry and an Air Force eight times the strength of ours at Aden. We had one Squadron to maintain internal order and guard against attack from land and sea..

Group Captain R. H. Verney, O.B.E., asked what was being done to open up the country by means of roads etc.

Group Captain C. L. Courtney, C.B.E., D.S.O., *p.s.a.* (Deputy Director of Operations and Intelligence, Air Staff), said that the United States of America was a wealthy country and we were almost on the verge of bankruptcy. Also Hawaii was extremely isolated and difficult to reinforce in time of war. Aden was not. This country could not afford adequate garrisons everywhere and the R.A.F. must be able to reinforce places like Aden rapidly.

For this purpose strategic air routes were being constructed. The Lecturer had not had time to explain that work on these lines had already been done in connecting Aden with 'Iraq along the southern coast of Arabia. The suggestion had never been made that one Squadron would be sufficient for all conditions at Aden. We could not afford to lock up in time of peace a garrison sufficient to guard Aden in time of war. Coast defence artillery on a pre-War scale still existed at Aden.

Squadron Leader Cochrane replying to Group Captain Verney said that part of the policy of the control of the Aden Protectorate was the opening up of roads and the improvement of the existing tracks. Replying to Colonel Pope-Hennessy he said that the force in Aden had been proved to be sufficient to deal with attack from the land. With regard to an internal rising British Forces in Aden still numbered 400 and the town was exceptionally suitable for action by armoured cars. Reinforcements could be got very quickly from Egypt or India.

The Chairman said that he had served on the Indian Frontier nearly all his life. There they had found that a system of reprisals when a tribe had committed a number of offences, was not satisfactory. Expeditions would be sent against the tribes and a certain amount of damage would be done and resentment would be left behind. This might apply equally to the Air Force operations in Aden.

The military authorities in India had come to the conclusion that they must punish the offending tribesmen and then occupy the territory and establish communications. They had a magnificent example in Waziristan where the authorities had opened up communications by the establishment of roads, railways, post-offices and telegraphs. They had not cleared out and there was a strong force there to-day which received great help from the R.A.F. He was afraid that in the case of Aden the tribes would find out that we had no troops there and we should be subject to a serious attack from within combined perhaps with an attack from the outside.—C. M. McA.

## AIR MINISTRY APPOINTMENTS.

The Air Ministry announces that in consequence of the retirement of Sir Henry McAnally, C.B., the senior Principal Assistant Secretary of the Air Ministry, which is taking place on Dec. 1, Mr. J. Stirling Ross, C.B., C.B.E., Director of Accounts, has been appointed a Principal Assistant Secretary, and Mr. J. M. Spaight, C.B.E., an Assistant Secretary, has been appointed Director of Accounts.

## A TRIBUTE OF A BROTHERHOOD.

A Memorial Service arranged by the Bedfordshire Province of the Royal Antediluvian Order of Buffaloes in honour of the twenty-eight members of their Order who were killed in the Airship R.101, was held in one of the sheds at Cardington on Nov. 16. After the Service a procession was formed and marched to the Cardington cemetery, where wreaths were laid on the grave.

## ACCIDENT INVESTIGATIONS.

In the House of Commons on Nov. 12, in reply to a question by Captain Macdonald, the Under Secretary of State for Air said that the Secretary of State for Air had the whole question of the investigation of aircraft accidents under his immediate consideration but he was not at present able to make any announcement on the subject.

## THE ATLANTIC FLIGHT OF R.100.

In the House of Commons on Nov. 11, in reply to a question by Mr. Mills, the Under Secretary of State for Air said that on the successful conclusion of R.100's Atlantic flight the officers and crew had been received at Cardington by the late Secretary of State for Air who had congratulated them in the warmest terms. The Secretary of State for Air agreed that the flight was a notable achievement for which the officers and crew deserved all credit, but he did not think that in the circumstances recognition of an exceptional kind would be appropriate.

Replying to a further question by Mr. Mills, Mr. Montague said that the crew of R.100 had not received any special leave after the double voyage across the Atlantic. No member of the crew had been discharged but any member would if, and when, he left, be furnished with a statement that he took part in the flight.

## SIDELIGHTS FROM NEW YORK.

Mr. G. Woods Humphery, Managing Director of Imperial Airways Ltd., arrived in New York on Nov. 16 for a conference with Mr. Juan Trippe, President of Pan American Airways Inc.

The custom of Imperial Airways Ltd. is to keep in touch with American practice in civil aviation, and the operations of Pan American Airways in the West Indies may also form a topic of conversation between these gentlemen without surprising interested onlookers.

The New York papers, however, have already projected an immediate trans-Atlantic airplane service via Bermuda and the Azores solely under the inspiration of Mr. Woods Humphery's visit. The routes and ports of call are already laid down, and the time tables are given in detail.

Thus a *Reuter* message from New York is reproduced in *The Evening Standard* this way:—

An air mail service between England and America, and ultimately a passenger service, is contemplated by Imperial Airways Ltd., of Britain, and the Pan-American Airways, according to several New York newspapers.

It is stated that Major Wood S. Humphrey, of Imperial Airways Ltd., is arriving on Sunday to negotiate with Mr. Juan T. Trippe, the president of the Pan-American Airways.

The first step contemplated will be the establishment of an air line from New York to Bermuda, which will be operated by the Pan-American Airways, but, as soon as possible, the Imperial Airways airplanes will carry on air communication to London by way of the Azores.—*Reuter.*

The Pan-American company intend to operate the New York—Bermuda leg with single-motored 'planes of high speed (the Central News says), while the Exchange adds that the proposal is to put the London—New York air mail service on a three-days' schedule.

We feel that on such an occasion "Major Wood S. Humphrey" should have been accompanied by his Chairman Sir Eri C. Geddies and by his solicitor Major Kenne T. Bomount, to make the party complete.

Further, in view of the nature of most of the trade between Bermuda and New York the phrase "the New York—Bermuda leg" seems to be incomplete. Surely the word "boot" has been omitted in error.

But perhaps the air-line scheme is designed to supersede boot-legging, seeing that with its help a New York business man can leave his office at lunch-time and be comfortably and legally drunk in Bermuda by dinner-time.

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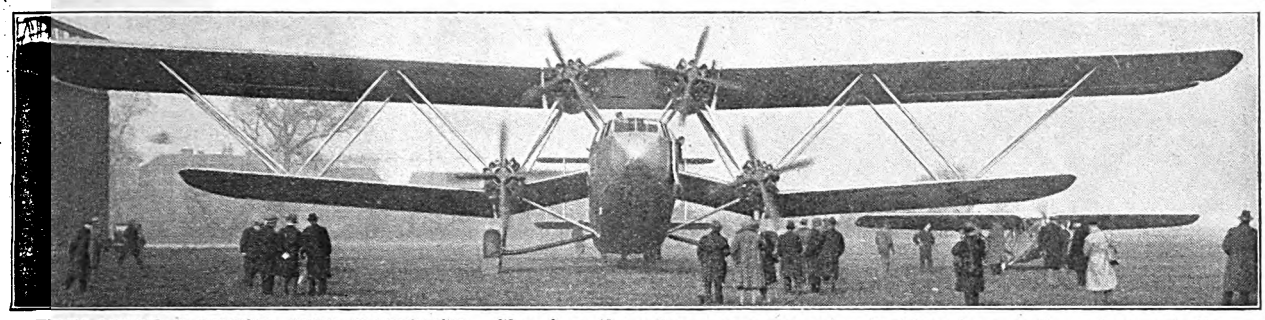

**ENGLAND'S LATEST AND LARGEST.—Showing the wing arrangement, strut-bracing and engines of the H.P. 42, known as Hannibal.** —(*"Aeroplane" photograph.*)

## INTRODUCING HANNIBAL.

After the visit of the Dornier Do.X onlookers unavoidably became blasé about out-size aviation. Even so the Handley Page 42 is a very interesting aeroplane with apparent virtues besides size, and it is rather bigger than ordinary, even if overshadowed by the German visitor of last week.

On Nov. 17 the long-heralded public appearance of the first forty-seater took place at the Radlett aerodrome of Handley Page, Ltd. It made its first flight on Nov. 15.

The construction of the machine has several novel features, both in general arrangement and detail design. The arrangement of the engines is one of the most notable. Two are faired into the lower wing so that the tips of the airscrews just clear the fuselage, and the other two are faired into the top centre-section closer together than the lower pair by about the width of the fuselage. The engines are geared Bristol Jupiters with four-bladed airscrews.

The wings, of orthodox two-spar metal construction, are mounted by fittings and vertical pins to their respective upper and lower centre sections, which form with the engines a sort of pyramid of struts in the form of an inverted W. The interplane bracing is also by struts in such a form that the lower wing is a single bay, and the upper a two-bay span. Only the outer pair of struts is provided with incidence bracing, which is a diagonal strut.

Ailerons are provided on the top wings only, and slots on the leading edge at the tips take up somewhat less of the span than the ailerons do.

The inner sections of the lower wings have a steep anhedral slope from fuselage to engines so that the cabin windows give out below the wing instead of above it. The sloped portions are braced by struts to the bottom longerons of the fuselage.

The fuselage is built on a kind of duralumin monococque principle from the nose to the back of the passengers' quarters. Beneath the floor is a duralumin girder structure which is surmounted by a lattice-work of built-up duralumin transverse frames and diagonal members. The corrugated metal skin is rivetted over this top part, but underneath the covering of the body is fabric. Backwards from the passengers' accommodation the fuselage is a simple steel-tube structure of four longerons, wire-braced, and duralumin fairings carry the fabric which forms the cover.

The two pilots sit in the extreme nose of the machine at the dual controls, which are of the standard wheel type without servo-gear. The seats slide sideways to allow egress or ingress through a wide passage, but are fairly close together when flying. Eight engine switches are mounted overhead with a master frame which throws them all when necessary. The four throttles are situated between the pilots and operate a single control to each engine which also turns the petrol on and off at certain positions on the quadrant and eliminates separate remote controls for this purpose. A small crank gives rudder-bias when necessary and a wheel trims the tail-plane.

The usual range of instruments appears on the board except engine-oil pressure and temperature. These eight dials are all mounted on a panel inside the wireless room and can be read by the second pilot through the glass window in the cockpit door.

**IN FLIGHT.—A view of the H.P. 42 just after taking off, showing the triple rudder, tail wheel and contours of the fuselage.** —(*"Aeroplane" photograph.*)

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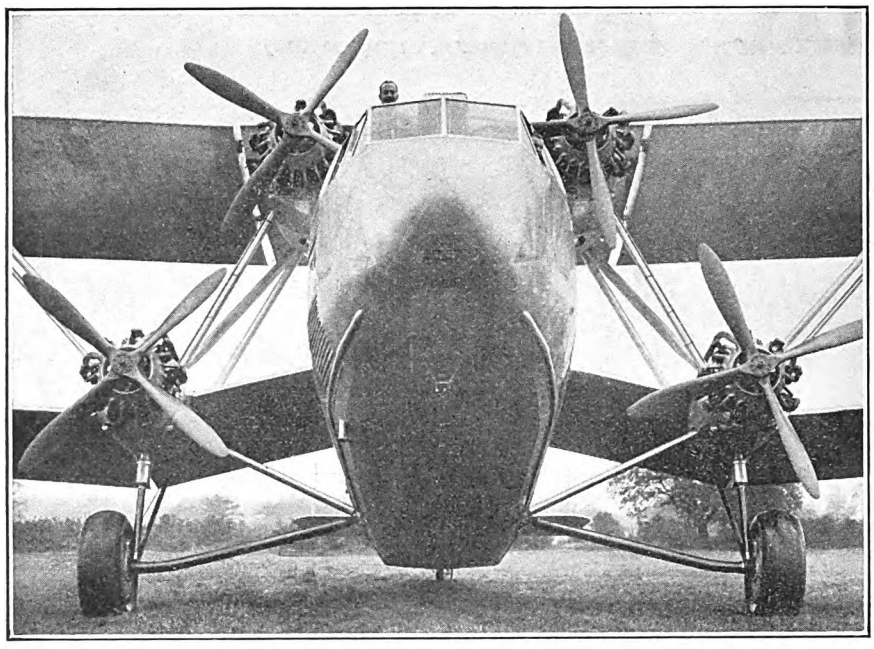


THE ENGINE PYRAMID.—The four Bristol geared Jupiters which gird the fuselage about. The specially wide design of the Dunlop tyres is noticeable.

Behind the wireless room is the forward passenger compartment for 12 people, and the next section includes the lavatories, bar, personal luggage and main luggage compartments in the Eastern variation of the H.P. 42. For European work part of this space will be taken for more passengers, but the first of its race is of Oriental persuasion and carries 26 passengers, crew, and large amounts of luggage, freight and mail.

The rearmost compartment is a large room for 14 more passengers, where smoking will be allowed. At present the machine is in the naked state and the expanses of "tin" give no idea of the glories to come when the interior decorator has had his way.

The undercarriage is simple in the extreme, and consists of two large Dunlop wheels on separate axles, each with a radius-rod back to the rear of the lower engine mounting and an oleo-pneumatic shock leg rising vertically to the lower wing at the engine. A tail wheel with castor action is provided with oleo and rubber shock-absorption.

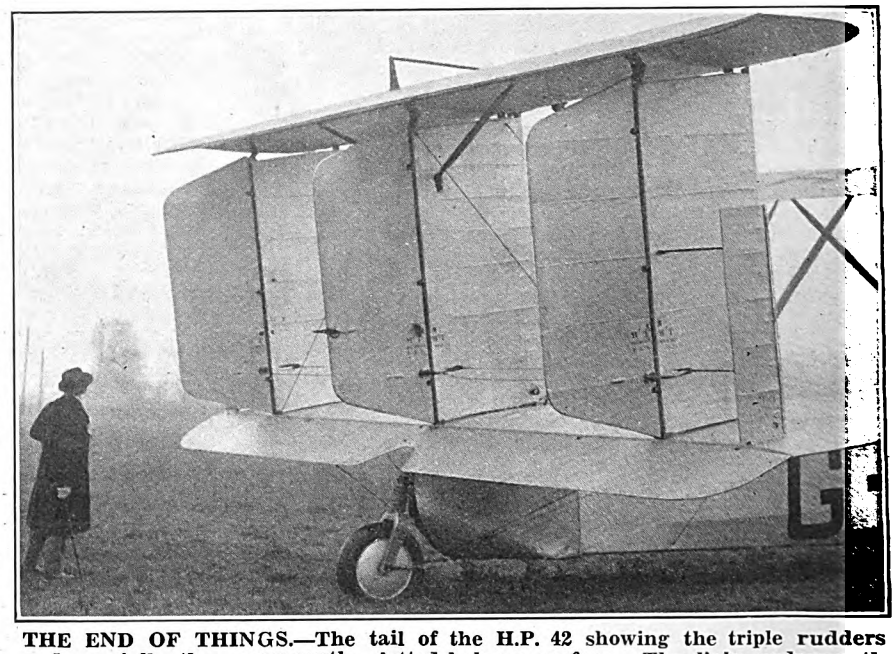
The tail unit is of biplane type and the upper portion can be adjusted by the tail-trimming wheel from the front cockpit. Elevators are hinged to both upper and lower surfaces and are unbalanced.

The three rudders all work in unison and are balanced by one auxiliary surface outside each of the outer rudders. These auxiliary surfaces, working much like the control balances of the Do.X, have permanently open slots all up their leading edges.

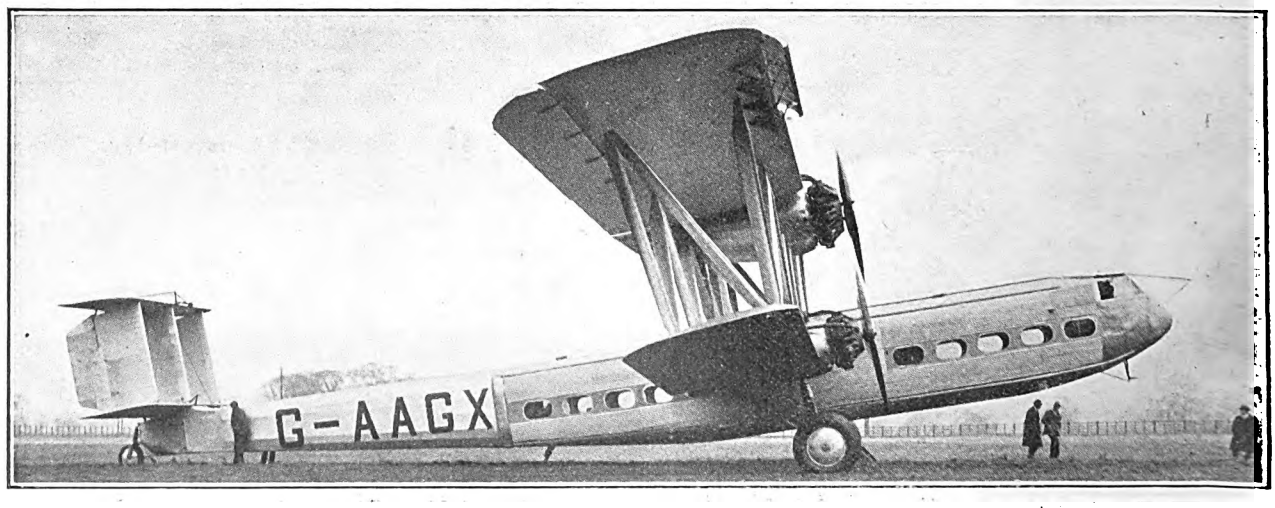
All fuel tanks are in the upper centre-section and feed the engines by gravity.

Ventilation has been given considerable attention, and fresh air which can be regulated between wide extremes of hot and cold is diffused from holes in the tubular members of the luggage racks.

The first of the type, which did its test flights on Nov. 15 and a demonstration on Nov. 17, is alleged to be called *Hannibal*, probably to encourage it to cross alps. With its considerable dihedral and interplane strutting *Hannibal* shows a definite relationship with the Gugnunc and the Hare. Its most startling feature—because its proportions are such that its size does not appear so extraordinary—is the projecting length of nose. The familiar Argosy attracts attention by its proportion of overhang, but the H.P.42 outdoes it comfortably. In fact it looks more like a flying-boat than a land-plane. Furthermore the pilots are in the extreme nose so far in advance of the



THE END OF THINGS.—The tail of the H.P. 42 showing the triple rudders and specially the permanently slotted balance surface. The links underneath the top tail plane allow it to be trimmed independent of the elevator.
—("Aeroplane" photograph.)




A SIDE ELEVATION.—The ease of entry into the long and spacious cabin can be judged from the leg disappearing amidships. In front of the pilots' window is the temporary horizon-sight.—("Aeroplane" photograph.)

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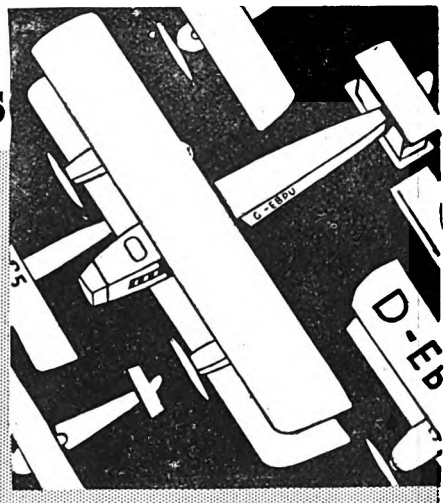


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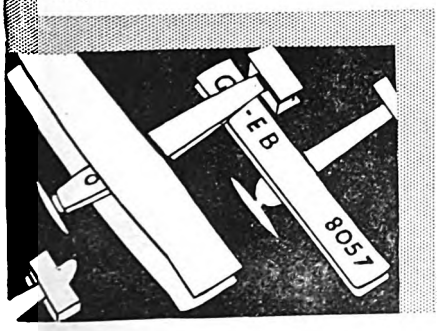


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centre of gravity that their movements bear strange relations with those of the machine when altering its attitude.

At first the mist of the morning prevented any attempts to fly, and it was noon before Sq. Ldr. T. H. England and Major J. B. L. H. Cordes went out together and took *Hannibal* for a few short hops for the benefit of photographers.

*Hannibal* had about 20,000 lbs. up at the time and was so about two-thirds of his designed weight fully loaded, but his take-off was remarkable. About seven seconds was enough to get off, and the landing seemed very slow although the ground angle of the machine is not great.

An hour or so later the mist cleared somewhat and the big machine took off and climbed quite fast to about 1,500 ft. In the air its appearance is impressive and interesting, although its great size and comparatively low speed give it an air of great deliberation. Actually it is designed for a speed of nearly 120 m.p.h. and is said to cruise at 100 m.p.h.

Among the interested spectators of the trials were Major R. H. Mayo, Consulting Engineer of Imperial Airways, Ltd., and Sir Helperus van Ryneveld, Director of Air Services for the Union of South Africa, who is joining Imperial Airways Ltd.

[With four-blade airscrews the machine may be free from some of the thumping or flapping which has done so much to shake loose parts of other aeroplanes in which the engines (with two-blade screws) have been built close down on and back to the leading edges of the wings as in this machine. And having two engines high up, with the petrol-tanks also in the upper centre-section, the centre of gravity may be so high as to minimise the tendency to wallow in bumpy weather which the general aspect of the machine suggests would be likely. Its behaviour in regular service will be watched with interest.—C. G. G.]

*Hannibal* is the largest machine yet built in England, even though its total span is only three feet greater than the largest Handley Page bombers built during the War of 1914-18. Its four Bristol Jupiters give it 2,000 h.p., which is more than the power of any other British machine.

The Do.X is the largest aeroplane in the World, but among the outsize rivals of the Handley Page 42 are the Caproni bomber, with a total of 6,000 h.p. in six Isotta Fraschini engines; the Junkers G38, which has 3,200 h.p. in four engines, and the Fokker F32, with 2,100 h.p. from four Pratt and Whitney Hornet engines.

The Caproni has broken World records for total weights carried to various altitudes. The Junkers G38 carries 40 passengers, and two of the Fokker F32s have been operating successfully on the West Coast of the United States with effective capacity for 36 passengers and a crew of four and a cruising speed of 120 m.p.h.

### ROME TO CAPE TOWN.

On Nov. 12 three Fiat AsI light aeroplanes with Fiat A50 85 h.p. engines arrived at Cape Town after flying from Rome in 16 days. The pilots were Signori Franco Mazzotti, Francesco Lombardi and Mario Rasini.

Their route by days was as follows: Oct. 28, Rome-Catania; Oct. 29, Catania-Tripoli; Oct. 30, Tripoli-Benghazi; Oct. 31, Benghazi-Tobruk-Cairo; Nov. 1, Cairo-Luxor; Nov. 2, Luxor-Wadi Halfa; Nov. 3, Wadi Halfa-Khartum; Nov. 4, Khartum-Malakal; Nov. 5, Malakal-Juba; Nov. 6, Juba-Nairobi; Nov. 7, Nairobi-Tabora; Nov. 8, Tabora-Abercorn; Nov. 9, Abercorn-Broken Hill; Nov. 10, Broken Hill-Bulawayo; Nov. 11, Bulawayo-Pretoria-Bloemfontein; Nov. 12, Bloemfontein-Cape Town.

### MORE MYSTERIOUS.

Mrs. Victor Bruce's Bluebird is going steadily Eastward in an unhurried and apparently uneventful manner, but is getting more and more mysterious.

She was weatherbound at Hong Kong for two or three days, but eventually got to Amoy and then to Shanghai on Nov. 15. Here again she stayed for two days before attempting the next stage, for which she started on Nov. 18.

Contradictory reports of the course she intended following were decided late on Nov. 18 by the news that she had landed at Seoul, Korea, after a direct flight from Shanghai along or over 600 miles of the Yellow Sea.

### THE FRENCH AERO SHOW.

The French Aero Show will open on Friday, Nov. 28, at the Grand Palais just off the Place de la Concorde. The promoters of the Show state that only new types of aeroplanes will be exhibited and that every country has entered light aeroplanes of one kind or another. They also draw attention to the fact that the buying of light aeroplanes is helped by the Governments of most countries and that what in France is called the *prime d'achat* may amount to 28,000 francs, approximately £250 or even more.

Those who are going over to Paris for the first time and want an hotel which is not too expensive and yet affords the comfort of the modern large hotel will find that the Regina, at the corner of the Rue du Rivoli and the Tuileries Gardens, a good place at which to stay. It is within comfortable walking distance of the Grand Palais and it is very handy for all the places of entertainment in Paris itself.

### LISBON TO GOA.

Two Portuguese officers, Capt. Moreira Cardoso and Lieut. Sarmento Pimentel, were reported in The Aeroplane of Nov. 12 as attempting a flight from Portugal to Nova Goa, in Portuguese India, in a D.H. Puss-Moth. Flying by way of Gaza they reached Karachi on the afternoon of Nov. 17.

**WELL AWAY.—A vivid impression of the H.P. 42 with its exceptionally long overhanging nose and the pilots' cabin at the tip.**—(*"Aeroplane" photograph.*)

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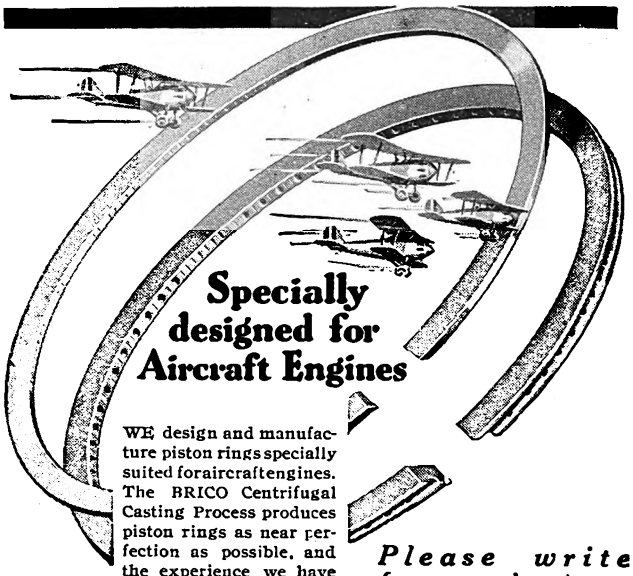

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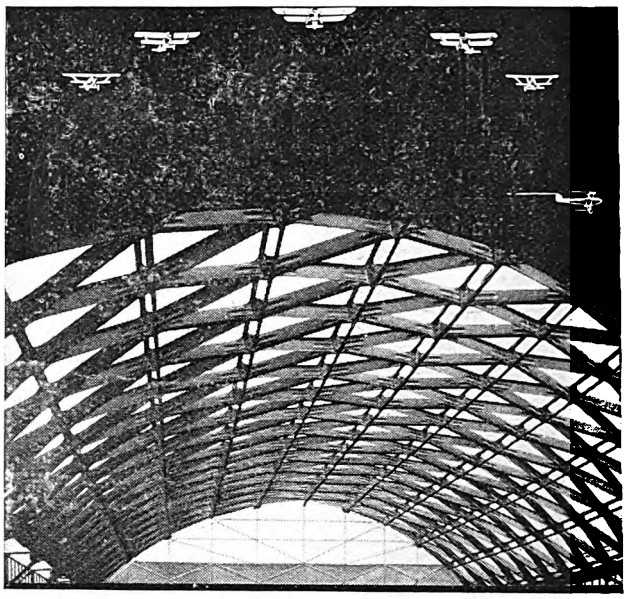

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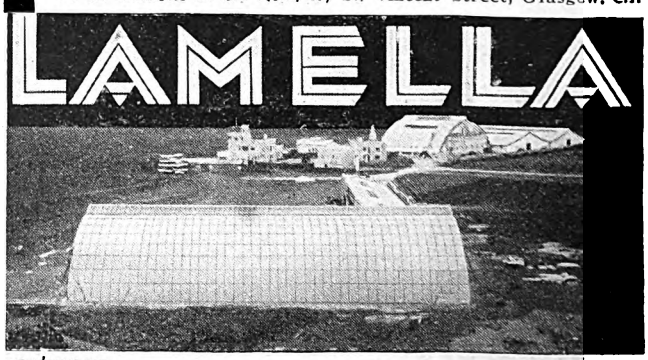


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# TRADE NEWS

## ROYAL APPROVAL FOR THE SARO CLOUD.

When His Royal Highness, the Prince of Wales, visited the Dornier Do.X at Calshot he travelled in the Saro Cloud (two Wright Whirlwinds) from and to London as stated elsewhere. The amphibian was placed at his disposal by Mr. Robert Holt and the pilot in charge was Mr. S. V. Scott, test pilot for Saunders-Roe Ltd. In the Prince's party were Colonel the Hon. Piers Legh, equerry to the Prince, Flt. Lt. H. Fielden (his private pilot), Flt. Lt. J. G. D. Armour, Mr. R. L. Preston, Coldstream Guards, and Mr. V. H. Baker.

The departure from Hendon was delayed by fog, but the waiting period was put to good use by His Royal Highness in making a searching inspection of the Cloud. The machine is of a type totally different from any of the wide variety in which he has flown before. The retractable landing gear, with cockpit indicator of the position of the wheels, the mooring facilities and the two 300 h.p. engines overhead with electric inertia starters were all subjects for his questions.

When the weather cleared, and Mr. Scott had taken off, the Prince took over and flew the machine practically all the way to Calshot. He remarked specially on the difference between a long cowling to trim on the horizon and the unobstructed view from the Cloud which provides no such reference. The resemblance in general type between the two machines, so different in size, made the Cloud a sort of introduction to the Do.X.

After his visit to the German giant the Prince again boarded a motor-boat for transfer to the Cloud, and as they approached the little 8-10-seater from the 74-passenger craft he exclaimed: "Good Heavens! She's shrunk!"

In spite of this unlooked-for effect of salt water the Cloud managed to accommodate the party as before and was flown back Londonwards by His Royal Highness. The fog was very thick over the city so the Cloud was landed at the Harmondsworth Aerodrome of the Fairey Aviation Company Ltd.

## PRIVATE OWNERS.

The purchase of aeroplanes for private use is almost out of the realm of news in this day and age, but some interesting sales have taken place recently. The Earl of Lovelace recently bought a Puss Moth from Brian Lewis and C. D. Barnard, Ltd., which he will take with him to his farm in Kenya. Both the farm and the aeroplane are called *Uflome*.

Mr. Francis Francis also made a double purchase from the same agents and acquired a Puss Moth and a Saro Cutty Sark amphibian. The latter is the first of its kind to be sold "over the counter" by an agent.

## THE NEW WAY.

The Aircraft Operating Company have now finished photographing 63,000 square miles of Northern Rhodesia in less than a year. About next June they expect to have prepared the maps from the photographs, which process is now under way, so that the whole job will be done in 18 months. A ground survey in similar detail would have taken ten years.

The Gloster Survey (two geared Bristol Jupiters) has been used for most of this work.

## THE DESOUTTER IN CANADA.

The following letter from the Aeronautical Corporation of Canada, Ltd., Winnipeg, Canada, will be found of unusual interest as showing how quickly a good thing is appreciated when it is shown to the right people:—

Dear Mr. Desoutter,—The Desoutter has arrived and is flying. We have had some delays with respect to tests by the Government, but nevertheless we have been carrying along, and we are certainly glad to report that everyone is highly pleased with the machine.

Immediately on arrival, Mr. Barker started off for a trip through Western Canada. Just about this time one of the worst blizzards that has swept the Prairies for years came up, and while Mr. Barker did not get into the worst of the blizzard, he did fly through a bad snowstorm and some very bad weather. He was perfectly delighted with the performance of the machine.

Mr. Barker flew over 2,000 miles on this first demonstration trip, calling and demonstrating the machine at the following places:—Brandon (Manitoba), Regina (Saskatchewan), Moose Jaw (Saskatchewan), Medicine Hat (Alberta), Calgary (Alberta), Red Deer (Alberta).

On the return trip Mr. Barker flew 860 miles in 6 hrs. and 20 mins. Everywhere everyone is enthusiastic about the flying qualities of the machine.

## THE ACCIDENT TO THE "CITY OF WASHINGTON."

A letter has been received by Rolls-Royce Ltd. from the Chief Inspector of Accidents at the Air Ministry stating that he is entirely satisfied that no question of engine failure or any trouble with either engine arises in connection with the accident to the Imperial Airways aeroplane *City of Washington*, which was wrecked at Neufchatel on Oct. 30.

## A GYRORECTOR IN THE Do.X.

The complex system of flying, engine, and navigating instruments in the Do.X has occasioned comment among all those who were privileged to see over the flying-ship. The multiplicity of engines alone calls for very careful organisation and strict discipline among the engineers whose duty it is to watch all the gauges.

As on board a ship, the Captain does not take the wheel or directly control the engines, so Captain Christiansen only gives commands to the pilots at the flying controls and the engineers in the engine-room. Only the closest attention to detail could ensure the safe handling of a flying-ship under such conditions where the speed is four times as high as that of a boat on the sea.

The same careful forethought is required to limit the number of instruments to the minimum consistent with safety, and one can be sure that only instruments of proved worth have been selected. Prominent among these is a Gyrorector, which is the German contribution to the science of blind and fog-flying.

British critics have said that the instrument is too heavy, but despite this contention Costes, whose long-distance flights are so well known, always uses this instrument. He must consider its weight to be offset by its value as a navigating instrument, and that in spite of the fact that every few pounds of weight that can be saved on a long-distance flight mean more miles.

He used it on his long flight to New York from Paris and had used the same instrument when he broke the World's Record for Distance in a straight line by flying from Paris to Tsitsihar. In a personal letter to the managing director of the French Gyrorector Company, Costes said that they had flown for about 23 hours without a glimpse of the sky or ground and in the midst of snow and rain. He says that without the Gyrorector they would have been forced to abandon the attempt.

Unlike the majority of British and American instruments, the Gyrorector shows the movement of the horizon relative to the aeroplane and not the movement of the aeroplane relative to the horizon. Cross and fore-and-aft levels are attached to the instrument and these used in conjunction with it allow the pilot accurately to determine his attitude in space. The instrument has a pendulum-gyroscopic system and is electrically driven by a constant-speed generator.

The agents for the Gyrorector in this country are George Pretyman Ltd., 8, Old Burlington Street, W.1.

## THE PISTOL CAMERA AGAIN.

The following letter received by The Williamson Manufacturing Co., Ltd., of Litchfield Gardens, Willesden Green, N.W.10, is of considerable interest:—

Dear Sirs,—I thought you would be interested to hear that I took one of your pistol type cameras with me when I recently made a short tour of Scandinavia and the Baltic States on a Puss-Moth seaplane.

The camera gave great satisfaction and I was able to secure a number of excellent photographs. It aroused considerable interest at the various ports of call and I was frequently asked to give the name and address of the maker.

I think, however, that in your own interests you should follow the matter up and get in touch with the various people in Norway, Sweden, Esthonia and Finland. If you would like me to do so I shall

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be pleased to send you the names and addresses of the people I saw out there who are interested in such matters, as they would no doubt be in a position to help you. They are all familiar with the camera and are well situated to advance your interests in the above countries.

I am taking the camera with me to-morrow on board the Do.X. and hope to get some good photographs during the flight to Bordeaux. (Signed) W. Sempill.

### "AEROPLANE" POSTCARDS.

A second set of six postcard photographs of modern British aircraft is now available and includes the Fairey Fox, the Fairey Firefly, the Hawker Fury, the De Havilland Intercepter, the Gloster Gnatsnapper and the Blackburn Ripon. Applications for this set should be made to the Photographic Dept., The Aeroplane, 175, Piccadilly, W.1, and marked Set "B." The price is 2s. post free.

### MANY INVENTIONS.

Imperial Airways Ltd. put up a smart bit of transport recently, when some films from Addis Abbaba came through on the Indian Air Mail from Alexandria, and arrived late in the afternoon at Croydon. They were immediately rushed onto a special which got as far as Old Sarum, landing there in pitch darkness. There they were transferred to a racing car, which in defiance of all known speed laws got to Plymouth in time for the films to be put on a speed boat which pursued and overtook a liner on the High Seas and the films were put aboard, and have by now been seen by most of the populace of the United States. They arrived here on Wednesday, caught the boat the same night and were in America on the following Monday.

Many notable and most notorious personages receive anonymous communications from time to time offering to bump them off free gratis and for nothing some dark night, with a sandbag. We are no exception, and a day or so ago, we had a letter which a handwriting expert would have diagnosed as written by a cross-eyed, cross-grained gent with a crossed nib. This, however, is not necessarily the case, as the handwriting was heavily disguised. In the top left-hand corner of the epistle there was a clue in the shape of a grimy and spatulate thumb mark.

When shown this Scotland Yard was baffled, for none of their low-class criminals had similar thumb prints, and it was only when we showed it to a professor of Zoology that the truth became clear. Our correspondent, it appears, was one of those highly-educated anthropoid apes whose photographs are occasionally seen with a bottle in one hand, a syphon in the other, a tumbler in the right foot and a cigar in the left, wearing dress clothes and a top hat, and enjoying the advantages of modern education with all the graceful abandon of an Oxford graduate.

The 'Varsity man has nothing on the educated ape, however, for few gents come down from Alma Mater capable of writing an ordinary letter with the right hand, let alone one with the left foot. We are, of course, accustomed to being ambushed by thugs behind hedges, and we have our own methods of guerilla warfare, but it is a little hard to have to watch out for anonymous half-bricks hurled from the tree tops by persons capable of hanging from a bough by means of prehensile toes and tail. [The anthropoids do not have prehensile tails.—Ed.—Poetic licence.—Spry.—Licence endorsed.—Ed.]

Below we give a few extracts from Dr. Bonson's new Aeronautical Lexicon, edited by Joswell, with copious notes by Mr. Harry Larkspur, author of "25 Years in a Submarine," "The Romance of a Modern Subway," "Adventures of Pontius the Pilot" (Tiny Tots series, with splash).

*Liner, Air.*—Any aircraft capable of carrying four or more passengers.

*Liner, Air Giant.*—As above but carrying not less than five passengers, one of whom may be an infant in arms and, therefore, not responsible for his or her actions.

*Luxe, de.*—Term applied to an air liner the cabin atmosphere of which is not more than 80% howling draughts, and which is comparatively watertight. De Luxe fittings include cuspidors and/or paper bags, noise which can be felt and vibration which can be heard, a smell of burnt oil and a pamphlet briefly describing the horrors of flying. This is a French expression introduced because no adequate Anglo-Saxon epithet exists for this state of affairs.

*Luncheon Basket, Air.*—Not a basket, but a dampish, highly collapsible cardboard box, containing adequate nourishment for one about to be unwell. Item, 1 tomato with thumbograph (blue godse brand). Item, 1 anatomical exhibit with two days' beard, said to be the limb of a fowl (probably the extinct great auk). Item, 1 grey slug thoughtfully provided with a large lettuce-leaf, also grey, posing as salad. Item, 1 pale-brown hollow mockery, set with hard-boiled currants. Item, 1 white paper-napkin for mopping the brow, price 17s. 6d. net, from Danker Taverns Ltd., Airport of Botley (in cloud).

From Vienna comes news of an astonishing young man who has built a helicopter in his spare time and backyard. It has no undercarriage nor wheels and is not designed to run forward at all when taking-off and landing. Despite a sulky 40 h.p. engine, the apparatus lifted its owner about five feet into the air absolutely vertically, which so surprised him, apparently, that he switched off his engine before the thing shot up into a more rarefied atmosphere with him. Naturally he descended "wallop," but luckily no damage to speak of was done.

One hears that the late Air Vice-Marshal Sir Sefton Brancker was extremely interested in it. The five-foot flight described above is vouched for by one of the oldest Imperial Airways pilots, and has no connection with any story which has appeared in the Press. It is, therefore, perfectly true, and the pilot in question, a very shrewd gentleman, was immensely impressed by what he saw, and with the possibilities of the machine.

The Henderson Aviation Bureau Ltd., and Mr. Charlie Allen in particular, took on a job recently in which speed appears to have been the essence of the contract. They arranged to teach Mr. Geoffrey Taylor, a dirt track racer in a hurry, how to fly. This they did with five hours' solo, and it is said that Mr. Taylor can taxi a Puss-Moth round an aerodrome (on one wheel at the corners) with his tail-skid in the air and his prop biting chunks out of the turf, faster than any living pilot.

The Air Ministry, by the way, seeing that the dust season has passed, have provided an official with a bright yellow lorry to which a dust cart is attached. His job is to travel up and down the Aerodrome, distributing vast clouds of reddish dust.

The rain comes in through the roofs pretty consistently, but we are a hardy race, and, like Chesterton (or something like him), we wander about singing "We don't care where the water goes, if it does not get into the ink." If these lines should meet the eye of Mr. Keir Smith, he will be interested to know that the spot of window-painting he requested Works and Buildings to do for his Office, last Michaelmas was a Twelvemonth, is now being got on with. A nobleman brought a ladder and placed it in position against his old office window, put a pot of paint at the foot of it, gazed upwards, shook his head mournfully, called it a day, and went away for a long week-end. You recognise the style—No?—

Spry.

### IN THE CITY.

By G. P. Kerr.

[These notes appear once in every Stock Exchange account and are intended to be of interest to those who hold or intend to hold investments in companies concerned directly or indirectly with aviation.]

Contango days: Nov. 17, Dec. 1.

Account days: Nov. 20, Dec. 4.

The past account brought bad news to the oil market. Probably no other industry is more closely associated with the progress of aviation, and the fall in the price of oil shares during the past fortnight has been watched with considerable interest by aircraft manufacturers, transport companies, and private owners. The wind which makes holders of oil shares feel the draught blows balmy breezes for the great public of petrol purchasers. The shares of the Shell Transport and Trading Co.; of the Anglo-Persian; of the Royal Dutch, all cost less to-day than they did a fortnight ago. "They are *bound* to go lower," said one of those cocksure market prophets to me the other day, "and so will petrol." And so will the cost of flying.

Russian oil interests have contracted to supply Tilling and British Traction and Automobile Company—one of the biggest road transport concerns in the country.with their next year's requirements at prices well below the current rate. Sooner or later other oil interests will be forced to bring their prices down.

Imperial Airways should benefit from any reduction in the cost of its fuel supplies, but at around 19s. their shares appear fully valued. Curiously enough, they exert a peculiar fascination to the small investor, and the market is con-

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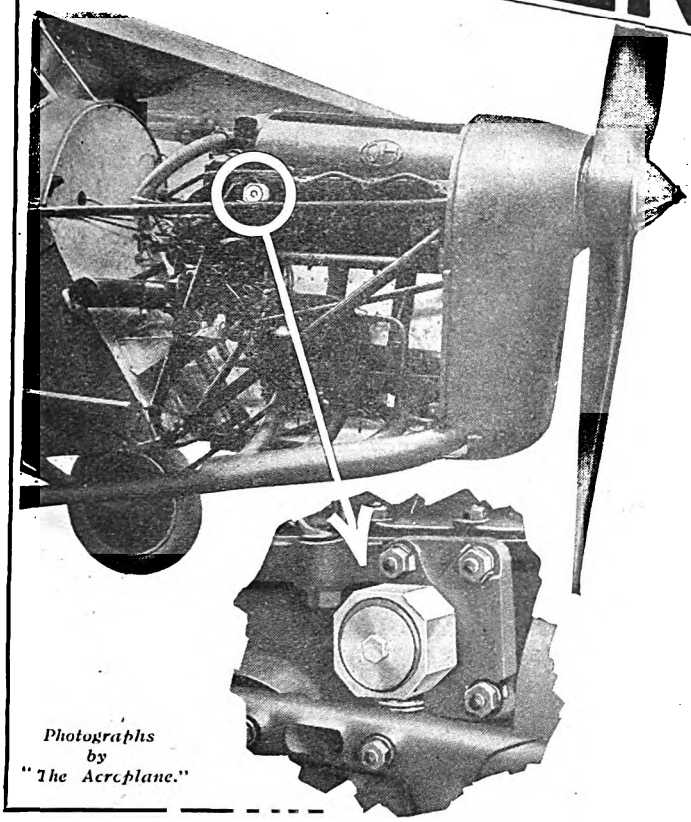

Photographs by "The Aeroplane."

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stantly asked for parcels of 50 or 100 or 200 shares. "You see," somebody explained, "if my grandfather had bought railway stocks in 1840 . . . . !"

The parallel may be admissible and Imperial Airways shares for the long-pull are good enough. But most investors, if they buy ordinary shares nowadays, are not content with distant prospects; they ask for a reasonably good return on their money *now*. Even if Airways fell to 17s. 6d. the yield to purchasers at that price would only be £5 14s. per cent., and nobody can suggest that the shares can be bought in the hopes of immediate capital appreciation.

The Company is pledged to heavy expenditure in developing long distance Imperial routes, which cannot be fully productive for years. It is true that it will be in receipt of large Government subsidies—diminishing to £70,000 for the year 1938-1939; it is true that until 1935 the maximum subsidy will be £310,000—nearly half the issued capital.—But it is difficult to believe that the Directors will be able to use the subsidy to pay dividends to shareholders!

Unless therefore there should be a sudden and quite unexpected increase in aerial traffic, 7½% looks the limit of distributions over the next year or so. Of course if the public suddenly took to buying aviation shares as they did in 1929 [and then largely American.—Ed.] Imperials would rise with the rest of the market; but even then they would be without the support of American buying, for no foreigner or his nominees is allowed to hold an Imperial Airways share.

New York took packets of Faireys and Handley Page and De Havillands during the boom, and they are now all coming back to London. The market sold De Havillands to New York at 40s. to 50s., Handley Page up to 24s., Faireys up to 22s., and New York has been selling these shares during the past account back to London at about 30s., 10s. 6d., and 11s. 3d. respectively. One is tempted to regard the story of American selling as so much market patter unless one is in personal contact with New York stockbroking houses from whom the orders come. So long as there are still an appreciable number of these shares left over the other side of the Atlantic I should not be in a hurry to buy any of them.

National Flying Services are of course a purely English market, and if the secret history of the rise of the Ordinary 2s. shares during the past account could be told it would make interesting reading. From being called "nothing to sixpence" after the annual general meeting, they have been steadily worked up until for a short time last week they were 10½d.-1s., and at this level an attempt was made to sell a fairly large number of shares. It is significant that they are back at 5½d. again

A fair business was transacted in Rolls-Royce £1 shares without appreciably altering the price. There was little doing in Napiers, and Petters were hardly mentioned. Rumours that the report of S. Smith and Son Motor Accessories would be satisfactory but that the profit figures were below last year's, brought some selling, and the Deferred closed lower at 3s.

| | Making-up Price. Nov. 3 | Nov. 17 | | Making-up Price. Nov. 3 | Nov 17 |
|---|---|---|---|---|---|
| De Havilland ... ... | 30/- | 30/3 | Nat Flg. Services Ord. 2/- | 5d. | 6d. |
| Handley Page 10% 8/- Pf. | 11/- | 10/6 | Do. do, Deb. | 40 | 40 |
| Fairey Aviation 10/- ... | 11/6 | 11/3 | Petters ... ... ... | 22/- | 22/6 |
| Do. Deb. ... | 100¼ | 100 | Rolls-Royce £1 ... ... | 40/7½ | 40/- |
| Imperial Airways £1 fy. pd, ... ... ... | 18/9 | 18/9 | S. Smith & Son, 1/- Dfd. | 3/6 | 3/- |
| | | | Do. do | | |
| D. Napier ... ... ... | 10/4½ | 10/1½ | £1 7% Pfd. Ord. | 30/- | 30/- |

## PERSONAL NOTICES.

### Births.

BETT.—On Nov. 3, 1930, at Ismailia, to Geraldine, wife of Mr. Patrick Bett, R.A.F.—a son.

BUSTEED.—On Nov. 7, at a nursing Home, Norwich, to Edith, wife of J. W. Busteed (late R.A.F.)—a daughter.

TURNER.—On Oct. 24, at "Rossett," Roehampton, to Norah, wife of Sq. Ldr. Cresswell Turner, A.S.C., R.A.F.—a daughter.

WATT.—On Nov. 13, at Malvern, to Elize, wife of Dudley Watt—a son.

### Forthcoming Marriages.

COLLINS—HALAHAN.—The engagement is announced between Capt. W. M. W. Collins, M.C., The Dorsetshire Regiment, son of Mr. and Mrs. W. W. Collins, late of Camberley, and Molly Doreen, daughter of Mrs. W. M. Halahan, of Weymouth, and Group Captain J. C. Halahan, C.B.E. A.F.C. (late R.A.F.).

ELLIOT—CHANCELLOR.—The engagement is announced between Sq. Ldr. W. Elliot, D.F.C., son of Mr. and Mrs. G. Elliot, 10, Regent's Park Terrace, and Rosemary, only daughter of Sir John and Lady Chancellor, 31, Hyde Park Square and Government House, Jerusalem.

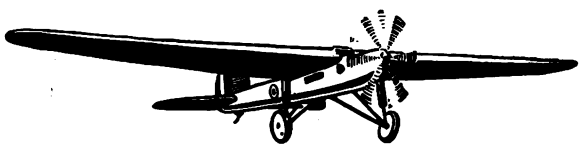
THOMAS—MACGEORGE.—A marriage will shortly take place between Flt. Lt. Harold Thomas, R.A.S., third son of Mr. and Mrs. Thomas, of Knighton, Radnor, and Margaret Joyce, only daughter of Lieut.-Col. J. B. MacGeorge, R.E. (Retd.).

### Marriages.

COMBE—BAINBRIDGE.—On Nov. 12, at Bournemouth, Flt. Lt. Gerard Combe, R.A.F., third son of Mr. and Mrs. Percy Combe, of Bournemouth, to Brenda Mary, elder daughter of Mr. and Mrs. Hugh Bainbridge, Killeen, Lakeside Road, Branksome Park, Bournemouth.

MARSDEN—CONDON.—On Nov. 12, at Uxbridge, Flt. Lt. John Marsden, R.A.F., to Muriel Gwendoline Condon (*née* Smith).

STEEDMAN—WILLIS.—On Nov. 15, at Kensington, Edward Blakeway Steedman, R.A.F., to Grace Isabel, daughter of Mr. and Mrs. Graveley Willis, of Leighton Buzzard.

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**Air Survey Co. Ltd.**, 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.

**The Aircraft Operating Co. Ltd.**, 8, New Square, Lincoln's Inn, London (Holborn 8131), and Broken Hill, Northern Rhodesia; Rio de Janeiro, South America; Contractors to the Ordnance Survey, Drawing Offices and Laboratories, Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

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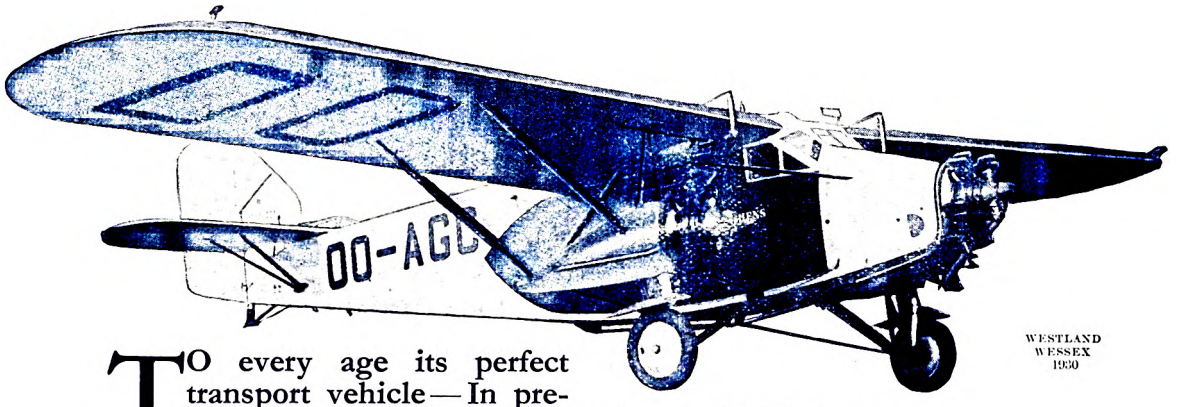


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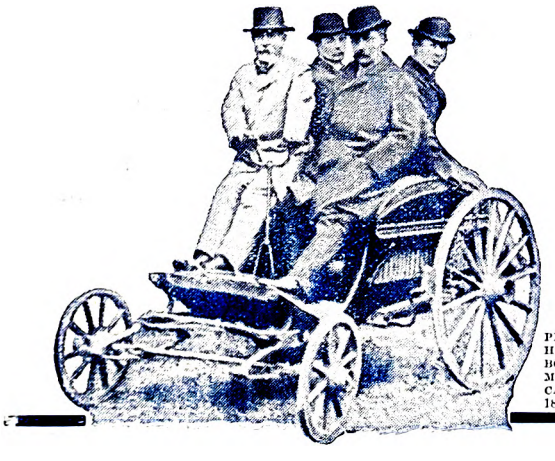

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## PREFACE.

This issue of THE AEROPLANE has been produced so that everybody in the World who is really interested in the development of aviation may be given a true and proper idea of recent developments in the British Aircraft Industry. It has been produced in co-operation with the British Aircraft Industry, and every firm which manufactures either aeroplanes, aero-engines, raw material, component parts or accessories for aircraft has been asked to participate in telling the World what the British Aircraft Industry has to sell.

Therefore this issue may be taken as a perfectly fair guide to the British Aircraft Industry. The opportunity of thus placing their wares before the Military, Naval and Civil Aviation Authorities of all nations and before the flying clubs and other aeronautical societies and organisations of all nations has been offered to everybody. And naturally those who have accepted the offer must be regarded as those who have the keenest appreciation of the possibilities of doing business abroad as well as being those who have the keenest wish to do business abroad. Consequently, buyers Overseas, whether in British Dominions or in other countries, may rest assured that they will receive the best attention from those firms who have co-operated with us in making their products known in this issue.

This year the Society of British Aircraft Constructors is not holding an Aero Show of its own. But readers of THE AEROPLANE will, we are sure, agree that if there had been an Aero Show the British Aircraft Industry could not have made a better display of its products in all countries Overseas than it is able to make in this publication. It is being produced at this moment so that those buyers of aircraft from foreign countries who intend to visit the Paris Show may have a just idea of what the British Aircraft Industry is producing before they go to Paris to see what the various aircraft manufacturers on the Continent are producing.

On the other hand, those buyers who cannot go to Paris will receive this copy of THE AEROPLANE before they receive the issues of THE AEROPLANE which report the exhibits in the Grand Palais. And so they will have a proper knowledge of the products of the British Aircraft Industry before they read of the exhibits in the Grand Palais.

Readers will see that British Aircraft, and everything that goes into them or with them, compare most favourably with anything that is built in any other country. For centuries British material and British workmanship has been the standard of excellence all over the World. And in the building of aircraft we can still claim first place for excellence. British aeroplanes on floats have travelled faster than any other vehicle in the World and have actually travelled faster than any other human product in the World with the exception of projectiles fired from guns. British aeroplanes have done more flying in the out-of-the-way parts of the World than have aeroplanes of any other nation.

So many British aeroplanes have flown to Australia that the whole route is now practically a prepared airway. And similarly so many aeroplanes have flown to the Cape that the promised Imperial Airways line will be flown over familiar ground. British flying-boats and British float-seaplanes have likewise journeyed along the coasts of all inhabited countries and across the most out-of-the-way seas.

## AVANT PROPOS.

Ce numero de THE AEROPLANE a été achevé afin que tout le monde vraiment intéressé dans le progrès de l'aviation puisse obtenir une perspective précise sur les derniers développements de l'Industrie Aéronautique de la Grande Bretagne. La réalisation de cette édition a été faite avec la co-opération de l'Industrie Aéronautique Britannique, et chaque constructeur ou fabriquant d'avions, de moteurs, de matières premières, d'éléments ou d'accessoires aéronautiques a été invité pour montrer au monde entier ce que l'Industrie Aéronautique Britannique peut vendre.

Donc cette publication peut être considérée comme le guide impartial de l'Industrie Aéronautique Britannique. L'occasion d'étaler leurs marchandises devant les Aéronautiques Militaires, Navales et Civils de tout pays, et devant les Clubs, les Fédérations et autres organismes aéronautiques en tout lieu, a été offerte à tous. Par conséquent, ceux qui ont accepté doivent être de ceux qui envisagent le plus clairement les possibilités d'entrer en relations avec l'Etranger, ainsi que de ceux qui désirent le plus d'étendre leur clientèle. Donc, les acheteurs outre-mer, qu'ils soient de l'Empire Britannique ou d'ailleurs, peuvent s'assurer qu'ils recevront l'attention la plus soignée de ces firmes qui ont bien voulu nous prêter leur concours dans cette exposition de leurs produits.

Cette année la Société des Constructeurs Aéronautiques Britanniques n'a pas organisé d'Exposition, mais nos lecteurs seront d'accord, nous sommes certains, que s'il y avait eu une Exposition, l'Industrie Aéronautique n'aurait pas pu exhibiter mieux leurs manufactures que celles décrites dans cette publication. Elle est présentée à ce moment afin que les acheteurs d'avions venant de tous les pays qui seront assemblés dans le Grand Palais à Paris, puissent avoir une idée juste de ce que fait l'Industrie Aéronautique Britannique avant leur visite d'inspection des produits d'outre-Manche.

D'autre part, ces acheteurs qui sont empêchés d'être presents, liront cette copie de THE AEROPLANE avant de recevoir celles qui décriront les expositions au Grand Palais, et par conséquent, eux aussi obtiendront une connaissance exacte des accomplissements de l'Industrie Aéronautique Britannique avant de lire les descriptions du XIII Salon de Paris.

Nos lecteurs apprendront que les appareils anglais, et tout ce qu'ils comportent, comparent très favorablement avec quoi que ce soit construit ailleurs. Pendant des centaines d'années le matériel anglais et l'exécution anglaise ont donnés l'exemple au monde entier, et dans la construction d'avions nous pouvons encore prétendre à la première place pour l'excellence. Des avions anglais à flotteurs ont coupé l'espace plus vite qu'aucun autre véhicule au monde, et ont, en effet, achevé une vitesse plus grande que tout autre création humaine sauf les projectiles lancés par canon. Nul autre appareil au monde n'a parcouru autant de pays éloignés que les avions anglais.

Tant d'avions ont fait la route de l'Australie qu'elle est maintenant presque entièrement une route commerciale. Et de même avec la route au Cap de Bonne Espérance—le service des Imperial Airways suivra une route bien connue. Des hydravions britanniques de toutes sortes ont rasé les côtes de tous les pays habités et ont traversé les mers les plus désolées.

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British air transport machines have proved themselves to be nearer paying propositions at reasonable fares than have the aircraft of any nation.

Besides this we can claim that we have in England at least two makes of single-seat fighting aeroplanes which are faster than any other fighting machines in the World. And our two-seat fighters and bombers and torpedo craft are also far in advance of those of any other country.

Our aero-engines likewise lead the World. Our water-cooled engines are the most powerful for their weight in the World. And our radial air-cooled engines are the lightest for their power. The same excellence of material and workmanship has put our low-powered engines for light aeroplanes equally in front of those of all other nations.

Among light aeroplanes the various British types are admittedly far in front of any others, whether single-seaters, open machines or cabin machines.

In all-metal construction, whether in steel or in aluminium alloys the British Aircraft Industry leads the World. We have always been famous as metal workers and in the Aircraft Industry we are upholding our reputation. During the past year or so we have developed cabin monoplanes of new types which are distinctly an improvement on those built in any other country, whether with one engine or three or four.

In accessories likewise we are holding our place. There was a time when English photographic material was considered inferior to Continental products. To-day English lenses and cameras and everything that is used in connection with air survey work lead the World, as is proved by the fact that more first-class air survey work has been done in the British Empire than in all the rest of the World put together.

Readers of these notes in other countries may consider that we are overstating our claims, but no claim has been made for excellence in this article which cannot be substantiated by anyone who will take the trouble to ascertain the facts. And in this issue of The Aeroplane such a buyer will find all that is best in British aeroplanes, British aero-engines, and British material, parts and accessories.—C. G. G.

Les avions de transport britanniques sont plus proches de réaliser une affaire avantageuse avec des tarifs modérés que sont tout appareil d'autre pays.

En plus, nous soutenons que nous avons en Angleterre au moins deux modèles d'avions monoplace de chasse plus rapides que tout autre avion de combat au monde. Et nos chasseurs biplace et bombardiers et torpilleurs sont aussi bien en avance de tout autre.

Nos moteurs, de même, sont en tête de tous. Nos moteurs à refroidissement par l'eau sont les plus puissants au monde pour leur poids. Et nos moteurs refroidis par l'air sont les plus légers pour leur puissance. La même excellence de matière et d'exécution a placé également nos moteurs de faible puissance pour avions légers en avant de tous les autres.

Parmi les avions légers les differents types anglais sont reconnus pour leur grande supériorité, qu'ils soient monoplaces, biplans ouvertes, ou à conduite intérieure.

Dans la construction entièrement métallique, ou en acier ou en alliages d'aluminium, l'Industrie Aéronautique Britannique est la première du monde. Nous avons toujours été connus comme travailleurs en métal, et dans l'Industrie Aéronautique nous gardons notre renommée. Durant les derniers dix-huit mois nous avons réalisé des monoplans limousine d'un nouveau type qui marquent un progrès définitif sur ceux de construction ailleurs, qu'ils soient équipés d'un moteur seulement ou même de trois ou de quatre.

Dans les accessoires nous sommes au premier rang. Autrefois, le matériel photographique anglais était considéré comme inférieur aux produits continentaux, mais aujourd'hui les objectifs et appareils photographiques anglais et tout ce qui est nécessaire au travail des levers aériens sont les premiers du monde. La preuve se treuve en ce que plus de phototopographie sérieuse a été faite dans l'empire britannique que dans tous les autres pays réunis.

Nos lecteurs d'outre-Manche croiront peut-être que nous avons exagéré nos titres, mais aucune réclamation d'excellence n'a été faite dans cette étude qui ne puisse être justifiée par quelqu'un de bonne foi, et dans cette publication de The Aeroplane cet acheteur trouvera tout ce qu'il y a de mieux comme avions anglais, moteurs anglais, et matériel accessoires et éléments anglais.—C. G. G.

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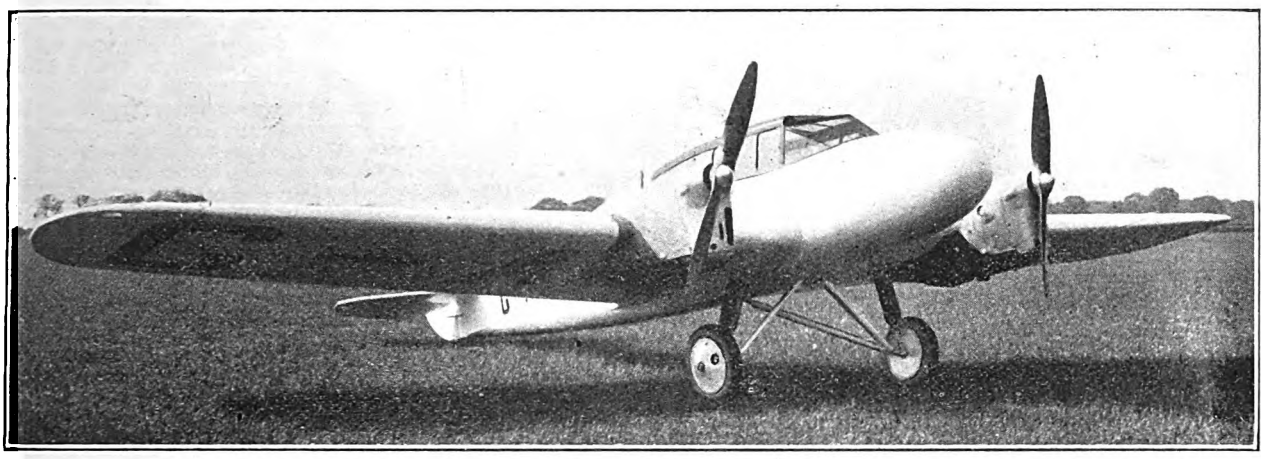

**The Segrave Meteor (two 120 h.p. D.H. Gipsy III engines).**

The Aircraft Investment Corporation Ltd. was founded in July, 1929, by important financial interests with the object of financing British Commercial Aviation. The Corporation has substantial interests in the Blackburn Aeroplane and Motor Co. Ltd., and in Saunders-Roe Ltd.

Early in 1930 the Aircraft Investment Corporation produced a twin-engined commercial monoplane known as the Meteor. This machine was designed by the late Sir Henry Segrave, who acted up to the time of his death as the Technical Director of the Corporation. Actually it was the first of a series of high-speed commercial aircraft that Sir Henry Segrave had planned.

The Meteor was designed as an economical high-speed touring monoplane to carry four people and the necessary luggage with the maximum degree of comfort.

It is a low-wing cantilever monoplane and is fitted with two 120 h.p. D.H. Gipsy III inverted four-cylinder-in-line air-cooled engines.

The wing, which is built in one piece, is a normal wooden structure and is covered with plywood. Built into the leading-edge of the wing are the two engine-mountings, one on either side of the fuselage. Each engine is completely enclosed in streamline cowling, which is faired into the top and bottom surfaces of the wing. The engines themselves are recessed into the leading edge of the wing, and the fact of their being inverted allows them largely to be incorporated in the wing itself. The two fuel tanks are carried in the wing, one on either side of the fuselage.

The fuselage is a metal structure of the monocoque type and is covered with Alclad.

The tail unit is of the monoplane type. The framework of all the surfaces is of welded steel tube and the covering is of fabric.

The undercarriage is of the divided type. Springing is provided by rubber-in-compression shock-absorbers.

The cabin has accommodation for four people seated in two pairs. The left-hand front seat is normally occupied by the pilot, but dual controls are fitted and the control column for the right-hand front seat is carried in clips on the side of the cabin when it is not in use. The two back seats are very roomy, and behind them there is space for the stowage of baggage The two back seats are easily removable if extra space is required for the carriage of freight or additional baggage.

The sides of the cabin have deep-sectioned windows, which can be opened if required, and the roof is panelled with transparent material. The front windscreen is of non-splinterable glass and slopes backwards to blend into the top line of the fuselage.

In the design of this machine every effort has been made to reduce drag, and the resultant clean aerodynamic design is very striking. One of the principal considerations in the design was to eliminate as far as possible the risk of forced landings due to engine failure, and it is claimed that the Meteor will not only maintain its height on one engine but will climb with full load with one of its engines stopped.

SPECIFICATION.

Span 39 ft. 6 ins., Length 28 ft., Height 7 ft. 6 ins., Wing area 230 sq. ft., Weight loaded 2,950 lbs., Speed, maximum, 145 m.p.h., Cruising speed 120 m.p.h., Cruising speed on one engine 80 m.p.h., Stalling speed 60 m.p.h., Initial rate of climb 950 ft./min., Ceiling 17,000 ft., Endurance 4½ hours at 120 m.p.h.

L'Aircraft Investment Corparation fut fondée en Juillet 1929 par un groupe financier important ayant pour but de financer l'aviation commerciale britannique. La société a des intérêts considerable dans les sociétés Blackburn et Saunders-Roe.

Au début de 1930 la société réalisa un monoplan commercial bi-moteur, nommé le Météor. Cet appareil fut concu par le regretté Sir Henry Segrave qui était, jusqu'au moment de son accident, le directeur technique de la société. C'était, en effet, le premier d'une série d'avions transporteurs surrapides qu'il avait envisagé

Le Météor fut établi en monoplan rapide de tourisme d'un grand confort pour le transport de quatre personnes avec leurs bagages. Modèle monoplane surbaissée, il est muni de deux moteurs D.H. Gipsy III inversés, de 120 CV., à 4 cylindres en ligne, refroidi à l'air.

L'aile monobloc est de construction classique en bois revêtu de contreplaqué. Les bâti-moteurs sont emplantés dans le bord d'attaque de chaque côté du fuselage. Chaque moteur est entièrement recouvert d'un capotage fuselé et caréné aux surfaces supérieures et inférieures de l'aile. Les moteurs mêmes sont escamotés dans le bord d'attaque de l'aile, et du fait qu'ils sont inversés, leur permettent de faire partie de l'aile même. Les deux réservoirs d'essence sont situés dans l'aile, de chaque côté du fuselage.

Le fuselage-coque est en métal, recouvert d'alclad.

L'empennage est monoplane. Le charpentage de tous les éléments est de tube d'acier soudé, revêtement de toile. Toutes les commandes, y compris celle du réglage de la queue, sont rigides avec des guides à rouleaux.

Le train d'atterrissage est sans essieu. L'amortissement est à moyen de ressorts à caoutchouc en compression.

La cabine comporte quatre sièges en deux paires. En general, celui à gauche en avant est réservé au pilote, mais une double commande peut être installée immédiatement pour l'autre siège à l'avant, en décrochant le manche supplémentaire du paroi. Les deux sièges à l'arrière sont très confortables et laissent de la place pour les bagages, mais il est facile de les retirer au besoin.

Les parois de la cabine ont des fenêtres profondes réglables, et le plafond est recouvert d'un matériel transparent. Le pare-brise en avant est de glace de sûreté, et s'incline en arrière vers le bord supérieur du fuselage.

Des études soignées ont été apportées à la question de réduire la trainée, et la finesse aérodynamique qui en résulte est très frappante Une des principales considérations du dessin était d'éliminer, autant que possible, les risques d'atterrissages forcés par cause de panne de moteur, et il est prétendu que le Météor non seulement peut maintenir sa hauteur avec un moteur, mais qu'il monte à plein chargement avec un moteur mort.

CARACTERISTIQUES.

Envergure 12 m., Longeur 8.55 m., Hauteur 2.23 m., Surface portante 21.4 m., Poids chargé 1,338 kg., Vitesse maxima 233 k.p.h., Vitesse croisière 193 k.p.h., Vitesse croisière avec un moteur 128 k.p.h., Vitesse minima 96 k.p.h., Montée initiale 290 m./min., Plafond 5,150 m., Autonomie 4½ heures à 193 k.p.h.

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# ARMSTRONG SIDDELEY MOTORS, LTD.

## HEAD OFFICE AND WORKS: COVENTRY.

Armstrong Siddeley Motors, Ltd. manufacture a range of ten air-cooled radial aero-engines varying from 80 to 800 h.p. and of this range they are showing the 5-cylinder Genet, the 5-cylinder Genet-Major, the 7-cylinder Genet-Major, the 5-cylinder Mongoose, the 10-cylinder Double-Mongoose, the 14-cylinder Jaguar, Jaguar-Major and Leopard engines at the Paris Salon de l'Aeronautique.

Of this series of engines the 140 h.p. 7-cylinder Genet-Major and the 10-cylinder Double-Mongoose are new and they will be making their first appearance in public.

### The 140 h.p. 7-cylinder Genet-Major.

As its name implies, the 7-cylinder Genet-Major has the same size cylinders as the Genet-Major, i.e. 108 by 114 mm., thus maintaining the economic policy of interchangeable parts. The engine is shown in the plain form and is suitable for powering multi-engined aircraft of the 5-7 seat type and for the more elaborate type of single-engined sporting light aircraft.

Its design is very similar to that of the Genet-Major engine in that the oil-pump unit is mounted in front and the gear-driven magnetos and carburettor are located at the back of the unit. The valves are operated through a forged steel cam-ring, tubular push-rods and overhead rocker-arms and springs, the latter being enclosed in quickly-detachable streamlined covers. The cylinders are made from steel forgings, the aluminium alloy heads being screwed and shrunk on to them and finally secured by a locking ring which forms a radiating fin. The complete cylinder is screwed into an adaptor in the crankcase and wedged securely by a clamping ring which is tightened by a single screw. This design is very simple and effective and distributes the explosion pressure equally all round the mouth of the crankcase. The "Y" alloy pistons are supported by fully-floating gudgeon pins on H section master and auxiliary rods. The crankshaft is of very sturdy design and is supported by three bearings, two of which are adjacent to the front and rear crank webs. The third which is situated in the front cover, takes the thrust of the airscrew in either direction.

The induction system incorporates a fan which not only thoroughly atomises the mixture but also distributes it equally to the cylinders.

The lubrication system is designed on the dry sump principal, a scavenge pump drawing oil from the sump through a strainer and discharging to the tank. On the way the oil passes through a chamber surrounding the induction chamber and this serves the dual purpose of heating the ingoing mixture and of cooling the oil.

The pressure pump draws oil direct from the tank and passes it through a strainer from which it reaches the centre of the crankshaft and crankpin. On its way a small quantity is drawn off to lubricate the timing gears.

Provision is made in the design of this engine for the fitting of a speedometer drive, petrol pump and hand starter.

### The 350 h.p. 10-Cylinder Double Mongoose.

The other new engine, known as the Double-Mongoose, forms an important part of the Jaguar series because it is

La société Armstrong Siddeley construit une série de dix moteurs pour avions, en étoile, à refroidissement par air, avec une puissance s'écartant de 80 a 800 CV. De cette serié elle expose au Salon Aéronautique à Paris le Genet à 5 cylindres, le Genet Major à 5 cylindres, le Genet Major à 7 cylindres, le Mongoose à 5 cylindres, le Double Mongoose à 10 cylindres, le Jaguar à 14 cylindres, le Jaguar Major et le Léopard.

De cette série de moteurs le Genet Major, 140 CVa, 7 cylindres, et le Double Mongoose à 10 cylindres sont nouveaux et sont exposés pour la première fois en public.

### Le Genet-Major 140 CV, 7 cylindres.

Comme son nom l'indique, le Genet Major à 7 cylindres a la même cylindrée que le Genet-Major, c'est à dire 108 by 114 mm., le système avantageux de pièces échangeables étant ainsi maintenu. Le moteur est montré dans sa forme simple et il est suffisament puissant pour des avions de 5-7 places et des appareils de sport de luxe. Sa construction est très semblable à celle du moteur Genet-Major en ce que la pompe à huile est fixée au devant et que les magnetos, entrainés par engrenage, et le carburateur sont derrière la pompe à huile. Les soupapes sont opérées par un plateau à cames en acier forgé, des tiges de commande tubulaires, des culbuteurs situés au dessus des cylindres, et des ressorts. Ces derniers sont enfermés sous des couvercles fuselés, rapidement démontables. Les cylindres sont en acier forgé. Leurs fonds en alliage à base d'aluminium y sont vissés, callés à chaud et assurés par un anneau de vérouillage qui forme aussi une ailette de radiation. Le cylindre complet est vissé à un adapteur dans le carter du vilebrequin, et calé par un collier serré par une seule vis. Cette construction est très simple et effective et distribue la pression de l'explosion autour de l'ouverture du carter. Les pistons en alliage "Y" sont supportés par des axes de pistons flottants sur des tiges maitresses et auxiliaires de section "H." Le vilebrequin est de construction solide, supporté par trois coussinets dont deux sont à côté des bras du vilebrequin, et le troisième placé dans le couvercle avant, soutient la poussée de l'hélice dans chaque direction.

La tuyauterie d'admission contient un ventilateur qui non seulement atomise le mélange, mais le distribue également aux cylindres.

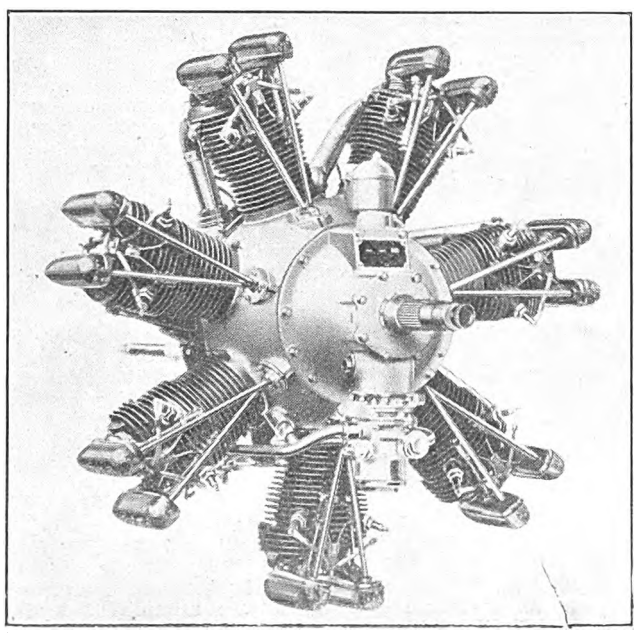
Le graissage est sur le principe du carter inférieur à sec. Une pompe de balayage aspire l'huile de la fosse à travers un tamis et la décharge dans le réservoir. Sur son chemin l'huile passe par une chambre entourant la chambre d'induction, ce qui sert à la fois à chauffer le mélange induit et à refroidir l'huile.

La pompe de pression prend l'huile directement du réservoir et la passe par un filtre d'où elle arrive au centre du vilebrequin et du tourillon. Sur son chemin une petite quantité d'huile est prise pour graisser la distribution.

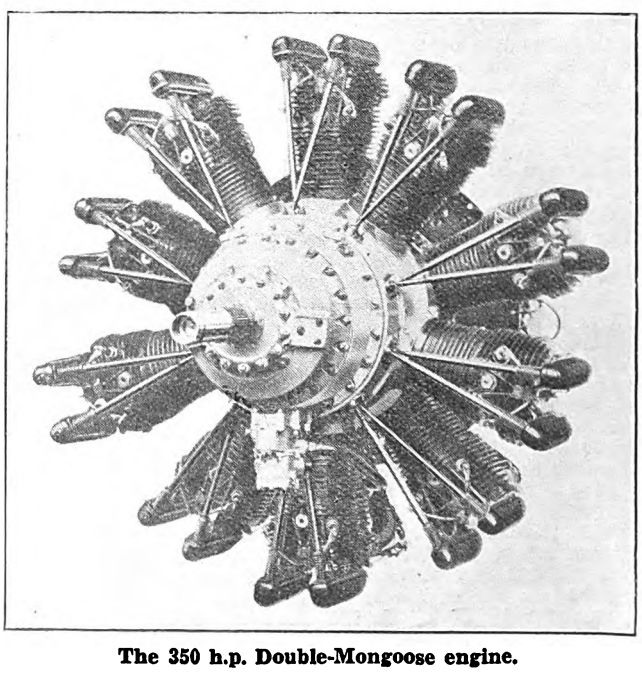
On peut aussi fixer à ce moteur une commande de compte-tours, une pompe à essence et un demarreur à main.

### Le 350 CV Double-Mongoose a 10 cylindres.

L'autre nouveau moteur, connu sous le nom de Double Mongoose, joue un rôle important dans la série Jaguar car



**The 140 h.p. 7-cylinder Genet-Major engine.**



**The 350 h.p. Double-Mongoose engine.**

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composed of 10 cylinders, of Jaguar size, thus maintaining a wide range of interchangeability with the Jaguar series. This engine is rated at 350 h.p. and has been produced to meet the demand of multi-engined aircraft in cases where constructors may prefer three 10-cylinder engines to two 14-cylinder engines. The size of the cylindres measures 127 mm. by 139.7 mm. and the capacity is 17.72 litres.

The auxiliary unit is fitted on the rear of the engine and accommodates speedometer drive, petrol pump, hand starter and spare drive at twice engine speed for generator, etc. Provision is also made for the fitting of a small triple oil pump on the front cover, a detail that makes the pressure filter more accessible.

**The 260 h.p. 7-Cylinder Lynx-Major.**

A third new engine in the Armstrong Siddeley range is the Lynx-Major, but this will not be at the Paris Show. This engine bears the same relation to the world famous Lynx that the Jaguar-Major, or Panther as it is called in the R.A.F., bears to the equally famous Jaguar. The Lynx-Major is a seven-cylinder engine of 260 h.p. with cylinders measuring 133.3 by 139.7, which gives a cubic capacity of 13.66 litres as against the 12.4 litres of the ordinary Lynx. Many of its parts are interchangeable with those of the Jaguar-Major, thus reducing the spares needed when both engines are employed together. The engine is fitted with a geared fan so that its rating of 260 h.p. is reached at an altitude of 2,500 feet at 2,000 r.p.m. On the ground it develops a maximum of over 300 h.p.

This engine is very compact in design and has an excellent power weight ratio. Its outstanding characteristics follow the well-tried Armstrong Siddeley design with regard to the construction of the crankcase, cylinders, pistons and valve gear. At the same time a few modifications have been introduced where desirable, among which may be mentioned the incorporation of the rear cover with the engine bearer flange. Provision is also made for the fitting of a gas distributor, C.C. gun gear, speedometer drive, petrol pump, inertia or hand starter and spare drive at propeller speed for the generator, etc. The auxiliary drive is constructed to be easily removed as a single unit.

Throughout the Armstrong Siddeley range a high degree of interchangeability has been secured with its concomitant advantages so far as servicing and maintenance are concerned by employing different numbers of the same size cylinders in different arrangements, on different engines. Thus the cylinders and many other parts of the 150 h.p. 5-cylinder Mongoose, the 350 h.p. 10-cylinder Double-Mongoose, the 215 h.p. 7-cylinder Lynx and the 400 h.p. 14-cylinder Jaguar are interchangeable. In a similar way the cylinders and many other parts of the Lynx-Major and Jaguar-Major are interchangeable, as is the case with the 5 cylinder and 7 cylinder Genet-Major engines.

All engines except the Lynx-Major, Mongoose, 5 and 7

il comporte dix cylindres de même alésage que le Jaguar. Un grand ordre d'interchangeabilité avec la série Jaguar est ainsi maintenu. Ce moteur est classé à 350 CV, et il est construit pour satisfaire à la demande pour avions à moteurs multiples, dans le cas oú les constructeurs préfèrent trois moteurs de dix cylindres à deux de quatorze. Les cylindres mesurent 12 mm. × 139.7 mm., et ont un volume de 17.72 litres.

L'élément auxiliaire est monté derrière le moteur et contient l'entrainement du compte-tours, la pompe à essence, le demarreur à main, et un entrainement de rechange de double la vitesse du moteur pour le générateur etc. Il y a aussi provision pour le montage d'une triple pompe à huile sur le couvercle avant qui rend le filtre à pression plus accesible.

**Le 260 CV, 7 cylindres Lynx-Major.**

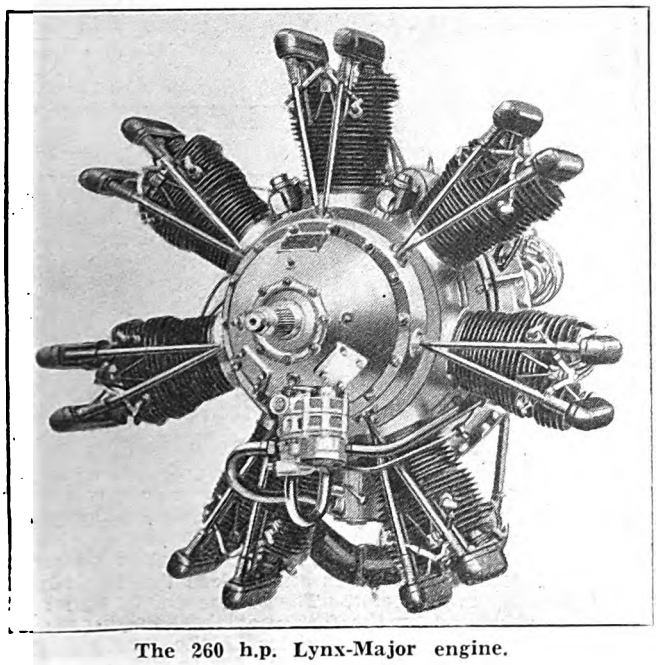
Un troisième moteur nouveau de la série Armstrong Siddeley est le Lynx-Major, mais il ne sera pas montré à l'Exposition à Paris.

Ce moteur tient la même relation au Lynx renommé que le Jaguar-Major (ou Panther comme il est appelé à la R.A.F.) tient à l'également célèbre Jaguar. Le Lynx Major est un moteur à sept cylindres, de puissance de 260 CV., avec cylindres mesurant 133.3 × 139.7 mm., qui donne un volume de 13.66 litres contre les 12.4 litres du Jaguar ordinaire. Beaucoup de ses pièces sont échangeables avec celles du Jaguar-Major. Lorsque les deux moteurs sont employés ensemble le nombre de pièces de rechange nécessaires est donc réduit. Le moteur est monté avec un ventilateur engrené de sorte que sa puissance de 260 CV. est atteinte à une altitude de 760 m., a 2,000 t/m. Au sol il développe une puissance maxima de plus de 300 CV.

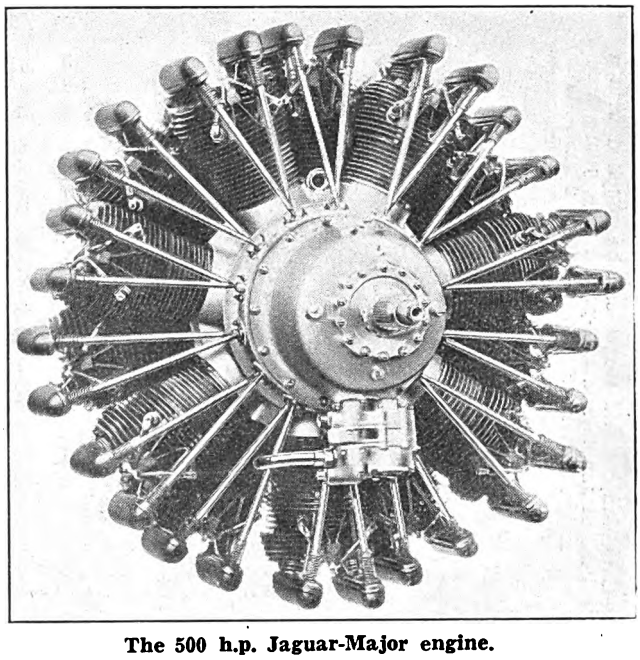
Ce moteur est de construction très compacte et a un excellent rapport de puissance au poids. Ses lignes générales suivent la construction bien éprouvée de la société Armstrong Siddeley du carter du vilebrequin, des cylindres, des pistons et du fonctionnement des soupapes. En même temps quelques modifications ont été introduites avec avantage parmi lesquelles ont peut citer l'incorporation du couvercle arrière avec le collet du support du moteur. Provision est faite aussi pour un distributeur de gaz, une commande de mitrailleuse, une commande de compte-tours, une pompe à essence, un demarreur à inertie ou à main et un engrenage de rechange à vitesse d'hélice pour le générateur etc. Le carter de l'engrenage auxiliaire est tel qu'on peut facilement le démonter en une seule pièce.

Dans toute la série Armstrong Siddeley un haut degré d'échangeabilité a été assuré, avec, par conséquent, de grands avantages dans le fonctionnement et l'entretien, en employant un différent nombre de cylindres semblables en dispositions variées dans les différents moteurs. Ainsi les cylindres et bien d'autres pièces du moteur Mongoose à 5 cylindres 150 CV. du Double-Mongrose à 10 cylindres 350 CV, du Lynx à 7 cylindres 215 CV, et Jaguar à 14 cylindres 400 cv, sont échangeables. De même, les cylindres et autres piéces du Lynx-Major et du Jaguar-Major sont échangeables, et aussi ceux des moteurs Genet-Major à 5 et à 7 cylindres.

Tous les moteurs sauf le Lynx-Major, le Mongoose, les



The 260 h.p. Lynx-Major engine.



**The 500 h.p. Jaguar-Major engine.**

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cylinder Genet-Majors and Genet can be supplied with a reduction gear of simple and well-proved type, giving a reduction of approximately .65 to 1. The Jaguar-Major and Lynx can be supplied with the Armstrong-Siddeley supercharger which was the first device of its kind to be perfected and produced in quantities. In addition to it a geared fan, which gives a partial supercharge at a comparatively low altitude, has been developed and is now available on the Jaguar-Major and Lynx-Major.

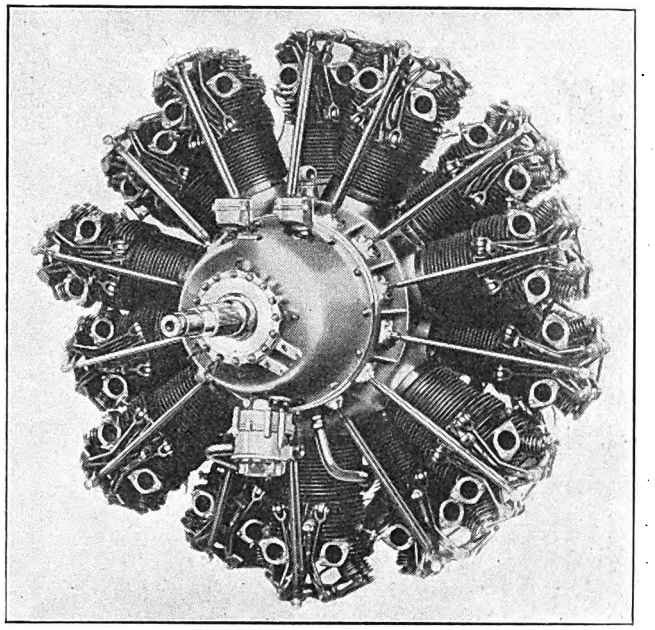
There are many other special patented features in this fine range of engines. Among them may be noted the extremely simple but efficient method of attaching the cylinder to the crankcase by screwing it into an adaptor in the case and wedging it by a clamping ring by a single screw. This forms a light and simple attachment which distributes the explosion pressure equally round the mouth of the crankcase instead of localising it at a few points.

The method of attaching the head to the barrel, which provides the best possible thermal contact and a perfectly pressure-tight joint, has proved extremely successful, the head being heated and then screwed on to the barrel where it is finally locked by a ring which forms a radiating fin.

Other special features in the design are the mixing fan which is incorporated in the induction system and the method of cooling the oil and heating the mixture by passing the oil through the jacket of the mixing chamber at one and the same time.

All Armstrong Siddeley air-cooled radial engines can be supplied with a Townend ring. This device considerably reduces the frontal drag of the engine and makes it comparable with that of the line ahead type.

The fine finish and workmanship displayed in this range of engine does these makers and indeed the British Aircraft Industry every credit. That these points are appreciated is evidenced by the fact that these engines are in use in over 20 different countries of the world and are also employed by the principal air lines in Europe and the Dominions.



**The 800 h.p. Leopard engine.**

5 et 7 cylindres Genet-Major, et le Genet, peuvent être munis d'un demultiplier de dessin simple et éprouvé, donnant une réduction d'environ .66 : 1. Le Jaguar-Major, le Jaguar et le Lynx jeuvent être munis d'un compresseur Armstrong Siddeley, qui fut le premier perfectionné et mis en construction de série. Il y a aussi pour le Jaguar Major et le Lynx-Major un mélangeur engrené qui donne une surcharge partielle à une altitude assez faible.

Il y a aussi plusieurs autres dispositifs brêvetés dans cette grande série de moteurs. On peut citer la méthode très simple mais efficace du rattachement du cylindre au carter du vilebrequin, en le vissant à un adapteur dans le carter et en le calant avec un collier serré par une seule vis. Ceci forme un attachement léger et simple qui distribue la pression de l'explosion également autour de l'ouverture du carter au lieu de la concentrer à quelques points.

Le moyen de relier le fond du cylindre à la culasse, qui donne le meilleur contact thermal possible et un joint absolument hermetique, a donné pleine satisfaction. Le fond est chauffé puis vissé à la culasse et finalement assuré par un anneau de vérouillage qui forme aussi une ailette de radiation.

D'autres détails intéressants de la construction sont le ventilateur mélangeur incorporé dans la tuyauterie d'induction, le moyen de refroidir l'huile et de chauffer le mélange en passant l'huile par une chemise dans la chambre de mélange simultanément.

Tous le moteurs Armstrong Siddeley à refroidissement par air peuvent être munis d'un anneau Townend. Ce système réduit considérablement la trainée frontale du moteur et le rend comparable aux modèles en ligne. Le grand fini et la précision d'execution de cette série de moteurs fait honneur à ces constructeurs et vraiment à l'Industrie Aéronautique Britannique. La preuve que ces caractéristiques sont appreciées, est que ces moteurs sont en emploi dans vingt pays différents du monde et sur les routes principales de l'Europe et de l'Empire Britannique.

SPECIFICATIONS OF THE ARMSTRONG SIDDELEY RANGE OF ENGINES.

| Type | LEOPARD | | Jaguar-Major | | JAGUAR | | | | Lynx Major | LYNX | | | Double Mongoose | | Mongoose | Genet Major 7 Cyl. | | Genet Major | Genet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P. | G. | GF | S | P | G | S | G & S | GF | P | G | S | P | G | P | P | G | P | P |
| No. of Cyl's. ... ... | 14 | | 14 | | 14 | | | | 7 | 7 | | | 10 | | 5 | 7 | | 5 | 5 |
| Bore .. ... ... | 6" | | 5.25" | | 5" | | | | 5.25" | 5" | | | 5" | | 5" | 4.25" | | 4.25" | 4" |
| Stroke ... ... | 7.5" | | 5.5" | | 5.5" | | | | 5.5" | 5.5" | | | 5.5" | | 5.5" | 4.5" | | 4.5" | 4" |
| Swept Volume Cu. Ins. | 2,969 | | 1667 | | 1513 | | | | 834 | 757 | | | 1080 | | 540 | 426.6 | | 319 | 251 |
| Swept Volume Litres | 48.65 | | 27.31 | | 24.80 | | | | 13.66 | 12.40 | | | 17.72 | | 8.86 | 7.32 | | 5.23 | 4.12 |
| Comp. Ratio ... ... | 5/1 | | 5/1 | | 5/1 | | | | 5/1 | 5/1 | | | 5/1 | | 5/1 | 5.35/1 | 5.35/1 | 5.35 1 | 5.25/1 |
| Engine r.p.m. normal | 1500 | 1700 | 2000 | | 1700 | 2000 | 2000 | 2000 | 2000 | 1900 | 2000 | 1900 | 2200 | 2200 | 1850 | 2200 | 2200 | 2200 | 2200 |
| B.H.P. Normal at Sea Level Rated | 700 | 800 | | | 400 | 450 | | | | 215 | 215 | | | | 150 | 140 | 140 | 100 | 80 |
| B.H.P. Normal at Sea Level Actual | 740 | 813 | 507 | 465 | 416 | 470 | 370 | 383 | 260 | 220 | 220 | 182 | 342 | 342 | 155 | | 145 | 103 | 82 |
| Max. B.H.P. at Sea Level for 5 Mins | | | 520 at 2000 r.p.m. | 482 at 2000 r.p.m. | | | 370 at 2000 r.p.m. | 395 at 2000 r.p.m. | 260 at 2000 r.p.m. | | | 190 at 1900 r.p.m | | | | | | | |
| Max. B.H.P. at Max. R.P.M at Sea Level | 800 | 840 | 549 | 482 | 446 | 495 | 380 | 398 | 282 | 235 | 235 | 190 | 350 | 350 | 165 | 155 | 155 | 110 | 88 |
| Gear Ratio ... ... | | .633 | .667 | | | .657 | | .657 | | | .657 | | | .657 | | | .663 | | |
| Prop. R.P.M. Normal | 1500 | 1076 | 1314 | | 1700 | 1314 | 2000 | 1314 | 2000 | 1900 | 1314 | 1900 | 2200 | 1445 | 1850 | 2200 | 1358 | 2200 | 2200 |
| Rated Power at Rated Alt. at Normal R.P.M. | | | 525 3000' 915m | 500 12000' 3655m. | | | 400 14500' 4420m. | 430 13500' 4115m | 260 2500' 762m. | | | 200 11500' 3505m. | | | | | | | |
| Power at Rated Alt. at Max. R.P.M. | | | 575 | 500 | | | 457 | 460 | 289 | | | 225 | | | | | | | |

P = Plain. G = Geared. GF = Geared Fan. PF = Paddle Fan. S = Supercharged.

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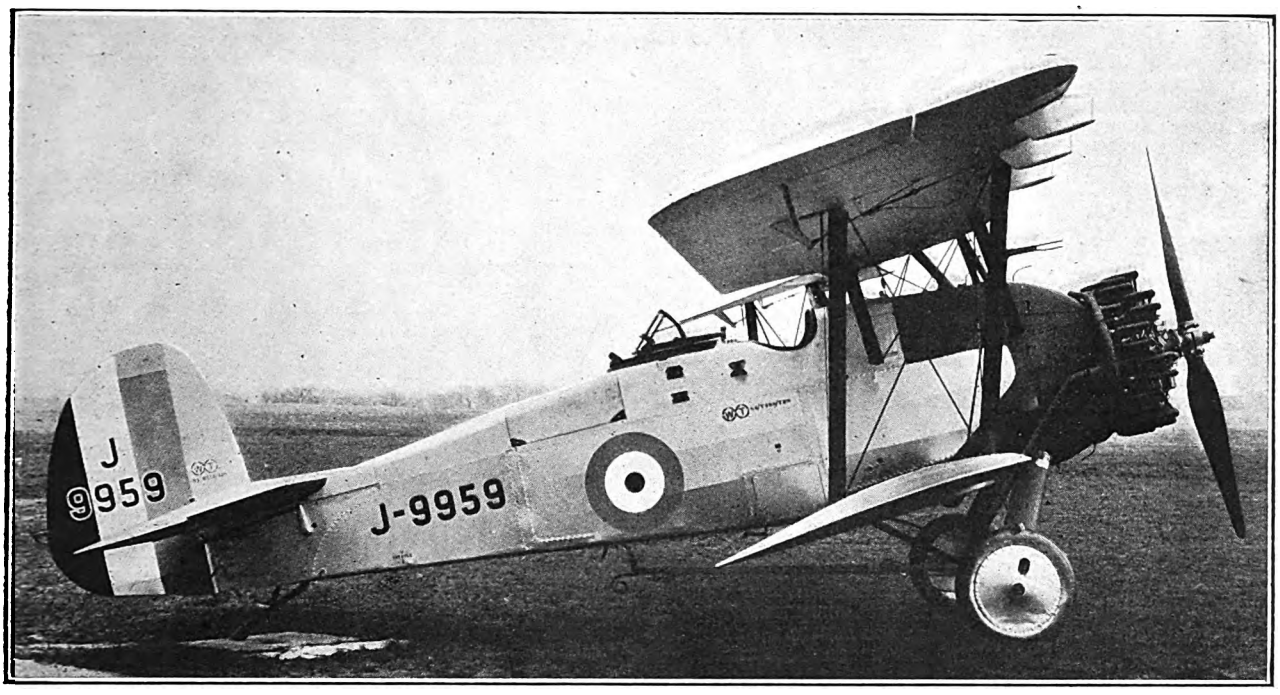
# SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LTD.

## HEAD OFFICE AND WORKS: COVENTRY.




**The Armstrong Whitworth Atlas biplane (Armstrong Siddeley Jaguar engine).**

One of the principal products of Sir W. G. Armstrong Whitworth Aircraft Ltd. is the Atlas two-seat Army-co-operation biplane. This particular type has been delivered in series to the Royal Air Force, and the Atlas is also being used in Canada and Greece.

The company is exhibiting a machine of this type at the Paris *Salon de l'Aéronautique,* and in addition to the complete machine they are also showing, in an uncovered form, the front portion of an Atlas fuselage, a lower main plane and an aileron.

They are also showing their proof-loading test machine, together with several cases containing sections of spars and ribs built on the company's patented system of sheet steel construction.

The Atlas biplane, with the Armstrong Siddeley Jaguar IVC engine and complete equipment, as exhibited, is the type of which large numbers have been supplied to the Royal Air Force for Army Co-operation duties. For this work it is fitted with an elaborate equipment, including two guns, one firing forward and one aft, a camera, complete wireless gear, message picking-up apparatus, and so forth. The aircraft is also arranged so that it can be used for bombing operations, and with the addition of extra fuel tanks it can be used for long-distance reconnaissance.

The Atlas has also been chosen by the Royal Air Force for advanced two-seater training. For this purpose the front and rear cockpits are fitted up to be similar to one another, the controls and instruments being duplicated. When the aircraft is used by one pilot, ballast weights are carried externally.

There are other applications for the Atlas machine. When fitted with metal floats and a geared Armstrong Siddeley Jaguar engine it becomes a successful seaplane with a quick take-off. It can also be used as a two-seat fighter, and in this case the geared Armstrong Siddeley Jaguar-Major engine, which can be plain or supercharged according Atlas is used as a high-speed bombing aeroplane it carries to the duties it is to perform, is recommended. When the four 112-lb. bombs.

The uncovered front section of the fuselage which is exhibited in Paris shows the method adopted by the company for using high-tensile steel tube joined together mechanically without the use of welding. The construction gives extremely consistent results, and in case of accidents makes it possible to make repairs without the use of special tools or appliances. The steel work, both for the fuselage and for the wings is thoroughly protected against rust by a special process of stove enamelling, ensuring that every part of the surface, both inside and out, is protected.

The fuselage is shown less tanks, engine, undercarriage and fairing, but the bulkhead, controls and seats are fitted.

The lower main plane, which is also shown in an uncovered state, is complete with controls and wiring. This is a beautiful piece of work and shows the great care and ingenuity taken in developing this form of steel construction.

Un des produits principaux de la société Armstrong Whitworth est l'Atlas, biplan biplace pour la co-opération militaire. Ce modèle a été fourni en série à la Royal Air Force et il est employé aussi au Canada et en Grèce.

La société expose un avion de ce genre au Salon de l'Aéronautique à Paris, et en plus, la partie avant à découvert d'un fuselage, une aile inférieure et un aileron. Leur appareil de charge d'essai sera exposé et plusieurs vitrines montrant des sections de longerons et de membrures construits à l'aide de leur système breveté, d'acier en tole.

Le biplan Atlas exposé, équipé d'un moteur Armstrong Siddeley Jaguar IVC, et l'équipement complet, est fourni à la Royal Air Force pour la co-opération militaire. Pour cet emploi il est muni d'un équipement comprenant deux mitrailleuses, dont l'une en avant et l'autre à l'arrière, un appareil photographique, un poste complet de T.S.F., et un dispositif décroche-dépêche, etc. L'avion est aménagé aussi pour le bombardement, et avec des réservoirs supplémentaires d'essence il peut être employé pour des reconnaissances à grand rayon.

L'Atlas a été choisi aussi par la Royal Air Force pour l'entrainement supérieur en biplace. Pour ceci les postes en avant et en arrière sont arrangés de façon pareil, et les commandes et les instruments sont doubles. Avec un pilote unique, l'appareil est lesté extérieurement.

L'Avion Atlas est encore adaptable à d'autres emplois. Muni de flotteurs métalliques et d'un moteur Armstrong Siddeley Jaguar démultiplié, il devient un excellent hydravion à décollage rapide. Il peut être transformé en avion de combat biplace, et dans ce cas il est préférable de l'équiper d'un moteur Armstrong Siddeley Jaguar à engrenage, soit ordinaire, soit avec compresseur, selon le travail imposé. Comme avion de bombardement rapide, l'Atlas porte quatre bombes de 50 kg.

La section avant du fuselage découverte exposée à Paris démontre la manière dont la société se sert de tubes en acier de haute résistance, joints mécaniquement, sans avoir recours à la soudure. Cette construction donne des résultats fort constants, et en cas d'accident il est possible de faire des réparations sans l'aide d'outils ou d'appareils spéciaux. Les parties en acier dans le fuselage et les ailes sont complètement protégées contre la rouille par un procédé spécial d'émaille au four, assurant à toute surface, tant à l'intérieur qu'à l'extérieur, une couche de l'agent protecteur.

Le fuselage est exposé sans réservoirs, moteur, train d'atterrissage ou carénage, mais la cloison, les commandes et les sièges y sont installés. L'aile inférieure qui est aussi montrée sans revêtement, comporte toutes les commandes et les cables. C'est d'une exécution de premier ordre et démontre combien d'étude et de soin ont été apportés dans le développement de ce genre de construction.

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# THE BLACKBURN AEROPLANE AND MOTOR CO., LTD.

## HEAD OFFICE, WORKS, AERODROME AND SEAPLANE SLIPWAY: BROUGH, YORKSHIRE.

### The Blackburn Sydney.

The Blackburn Sydney, the largest military monoplane flying-boat in this country, is designed to undertake the same duties as the well-known Blackburn Iris type, namely Reconnaissance and Coastal Patrol, either independently or in co-operation with sea craft, and it is arranged to carry a similar crew and military load.

The Sydney is a high-wing semi-cantilever monoplane, and is constructed entirely of metal, with the exception of fabric covering on the wing and tail-unit. The hull, like that of the Iris, has a deep forefront and is well flared to keep down spray. In the Sydney, however, the sides of the hull above the water-line are nearly perpendicular, whereas those of the Iris slope towards the deck at a noticeable angle. As a result, in spite of less beam in the Sydney, the interior is much more roomy. From the second step the lines sweep upward to the stern, in which a tail-defence machine-gun station is provided behind the centre rudder.

The centre-section wing is supported above the hull by a steel tubular structure built up on the hull and faired to form a streamline nacelle, and two pairs of sloping struts brace the extremities of the centre-section to the hull. The outer wing sections taper to the tips in both plan and elevation. The whole wing on each side of the hull has a noticeable dihedral angle. Wing floats are set comparatively close to the hull and are supported from the centre plane by two pairs of struts which bisect the wing-bracing struts.

The tail-plane is a braced monoplane and is fitted with trimming and controlling elevators. No fins are fitted, and the three rudders, which are unbraced externally, incorporate servo control, which can be engaged or disengaged as required.

Three 525 h.p. Rolls-Royce F.XII M.S. engines are mounted in nacelles, which are faired into the top of the leading edge of the centre section of the wings. Each unit includes a water tank, radiator and shutters and oil tank and cooler. The main petrol tanks are carried in the faired structure between the hull and wing and fuel is supplied by engine pumps through a distributor control.

Accommodation is arranged for a normal crew of five, comprising pilot, second pilot-navigator, wireless operator, engineer and gunner. Three machine-gun stations are provided, namely, a bow cockpit, an aft cockpit behind the wing and a tail-defence cockpit in the stern. The pilot's cockpit has side-by-side dual control and is enclosed with sliding side windows and roof panels. In the interior the forward portion contains navigator's and wireless operator's stations and officers' living and sleeping quarters. Further aft are the engineer's station, men's sleeping quarters, enclosed lavatory, galley and storage for supplies, etc.

With the exception of over-all dimensions, given below, no figures are available:—

DIMENSIONS.

Span 100 ft., Length 65 ft. 7 in., Height 19 ft. 2½ in.

### Le Blackburn Sydney.

L'appareil Blackburn Sydney, le plus grand hydravion monoplan militaire en Angleterre, est construit pour assurer un service pareil au type bien connu Blackburn Iris, à savoir, la reconnaissance et le patrouillage des côtes, soit indépendamment, soit conjointement avec les navires de la marine, étant disposé pour un équipage et une charge militaire identiques.

L'appareil Sydney est un monoplan aux ailes surélevées, à moitié en port-à-faux, et de construction entièrement métallique, exception faite de l'entoilage des ailes et de la queue. Le coque, pareille à celle de la Iris, est de forte profondeur dans la partie antérieure et bien fuselée pour réduire l'embrun. Dans le Sydney cependant, les parois de la coque au-dessus de la ligne d'eau sont tenues presque perpendiculairement, tandis que celles de la Iris s'inclinent vers le bord à un angle prononcé. Par conséquent, bien que sa largeur soit inférieure à celle de la Sydney, il y a bien plus de place à l'intérieur. A partier du deuxième rédan, les lignes s'étendent en ligne montante vers l'arrière où se trouve un poste de mitrailleuse derrière le gouvernail central pour la défence vers l'arrière.

La partie centrale de l'aile est supportée au-dessus de la coque par un cadre en tube d'acier monté sur la coque et formé en manière d'une nacelle fuselée, deux paires de montants inclinés étant pourvues pour réunir les extrémités de la partie centrale avec la coque. Les parties extérieures de l'aile diminuent vers les pointes en largeur et en épaisseur. De chaque coté de la coque l'aile entière est tracé à un angle assez dièdre. Les flotteurs d'aile sont relativement proches à la coque et supportés par le plan central par l'entremise de deux paires de mâts qui bisectent les montants entretoisant les ailes.

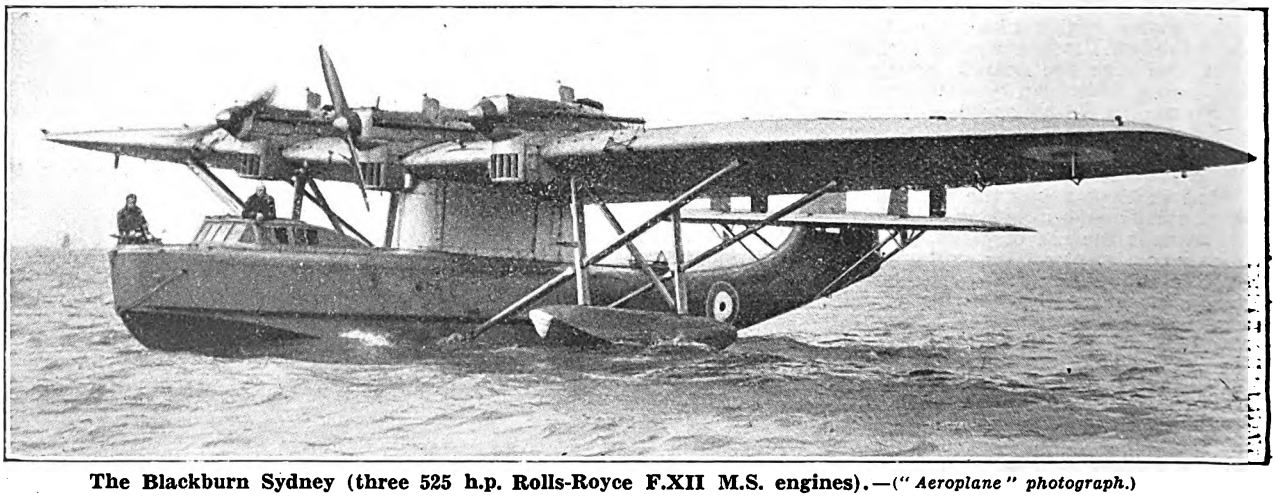
Le stabilisateur est un monoplan haubanné, équippé de gouvernails de profondeur, et de commande et de réglage. Il n'y a point de plans fixes verticaux, et les trois gouvernails de direction qui ne sont pas haubannés extérieurement sont commandés par un servo-moteur pouvant être mis hors de service, le cas échéant.

Trois moteurs Rolls-Royce F.XII MS. de 525 CV. chacun sont installés dans les nacelles fusellées dans la partie supérieure du bord d'attaque du plan central. Chaque groupe comporte un réservoir d'eau, radiateur muni de volets, ainsi qu'un réservoir d'huile avec système de refroidissement. Les réservoirs d'essence principaux sont logés dans le cadre fuselé entre la coque et l'aile, le combustible étant alimenté par des pompes d'essence par l'entremise d'une commande de distribution.

L'équipe normale comprend cinq personnes, soit le pilote, second pilote-navigateur, ingénieur de T.S.F., mécanicien et mitrailleur. Trois postes de mitrailleuse sont amenagés, à savoir une carlingue de proue, une carlingue arrière à l'arrière de l'aile, et une carlingue de défense vers l'arrière dans la poupe. La carlingue du pilote est pourvue d'appareils de commande doubles côte à côte; compartiment clos, elle est munie de fenêtres coulissantes et de panneaux dans le plafond. A l'intérieur, la partie avant renferme les postes de navigateur et de T.S.F ainsi que les quartiers d'officier, de travail et de repos. Plus loin à l'arrière se trouvent le poste de mécanicien, les quartiers d'équipe de repos, lavabos enclos, cuisine, et dépôt de provisions, etc.

Exception faite des dimensions totales ainsi que nous les renseignons ci-dessous, il n'y a pas d'indications détaillées disponibles:—

Envergure 30.50 m., Longeur 20.00 m., Hauter 5.85 m.



**The Blackburn Sydney (three 525 h.p. Rolls-Royce F.XII M.S. engines).**—(*"Aeroplane" photograph.*)

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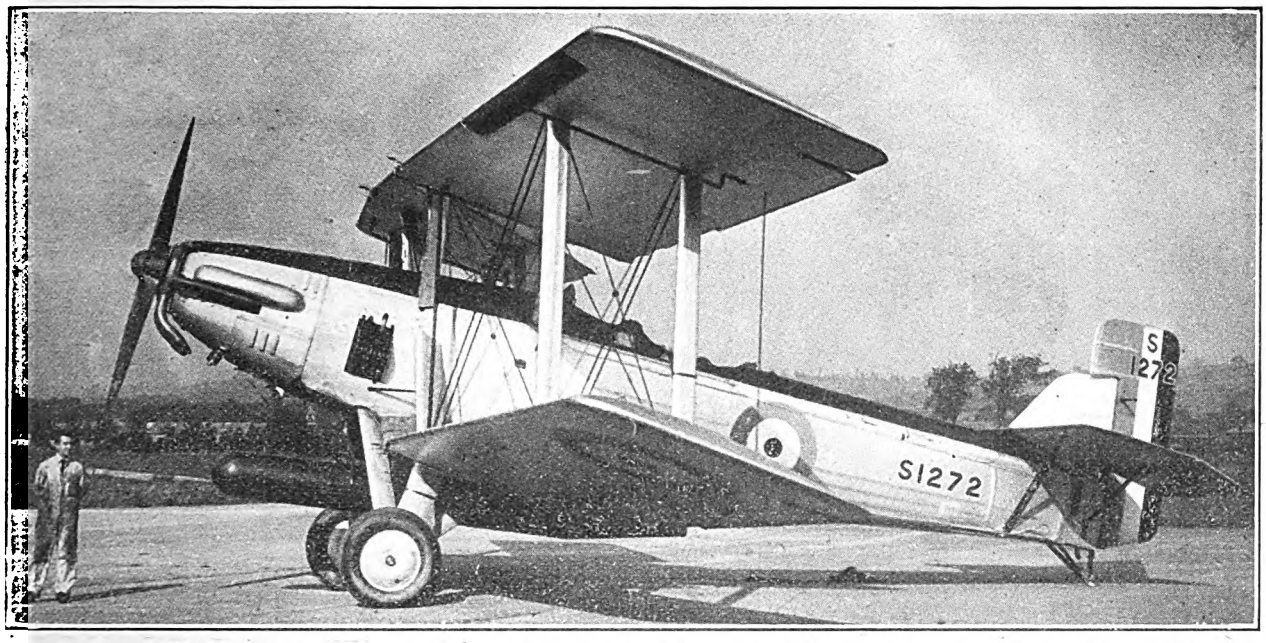



The Blackburn Ripon III torpedo-carrying biplane (570 h.p. Napier Lion engine).—("Aeroplane" photograph.)

### The Blackburn Ripon.

The Ripon is the latest Blackburn Coastal Defence type adopted by the Air Ministry as standard torpedoplane equipment in place of the Blackburn Dart, which has occupied that position since 1920. A modified type, fitted with the Bristol Jupiter engine, is being built under licence in Finland.

The Ripon is a two-seater single-bay biplane with Napier Lion XI engine, Frise type ailerons, Handley Page interconnected slots, folding wings, split type oleo-pneumatic undercarriage, etc. It can be supplied in all-metal or composite construction and it can also be converted from a land plane into a seaplane by the substitution of twin-metal floats for the wheeled undercarriage. It was designed primarily as a torpedoplane for deck operation, but it can be convertible for bombing or reconnaissance work. Its armament of two machine-guns, in addition to projectile armament makes it fully capable of self-defence.

SPECIFICATION.

Gross weight (as torpedoplane) 7,282 lbs., Military load 1,970 lbs., Wing area 682 sq. ft., Wing loading 10.7 lbs./sq. ft., Power loading 12.8 lbs./h.p., Top speed at sea-level 132.5 m.p.h., Landing speed 59 m.p.h., Rate of climb from sea-level 800 ft./min., Service ceiling 13,000 ft., Endurance 3 hours at full-power.

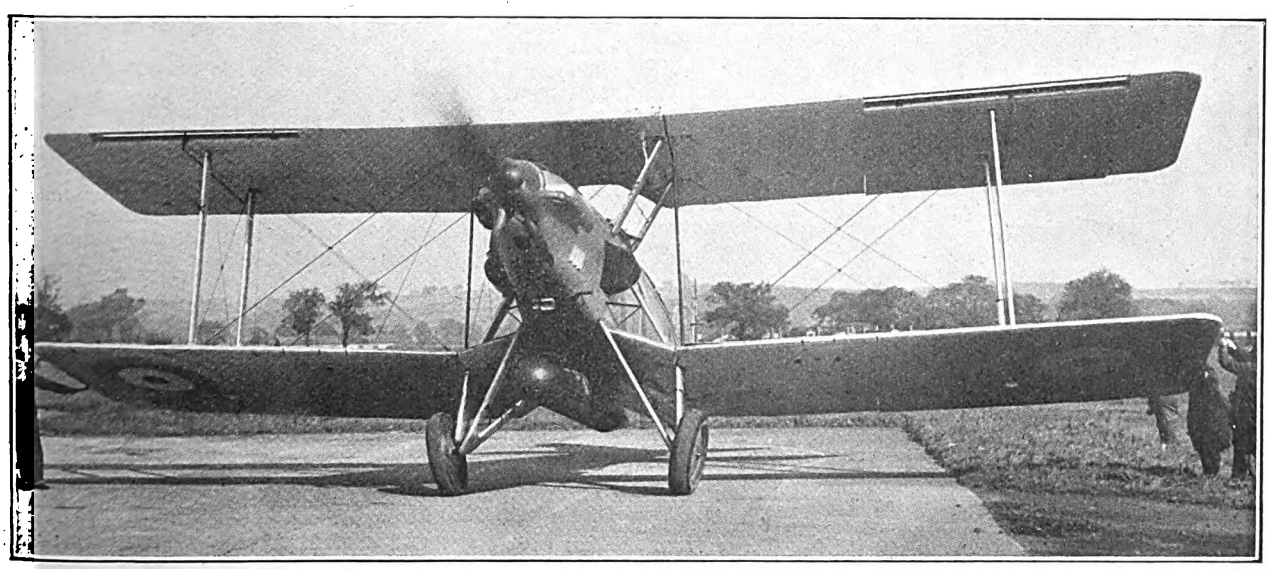
### Le Blackburn Ripon.

L'appareil Ripon représente le dernier type d'avion Blackburn la défence des Côtes adopté par le Ministère Aéronautique Britannique à titre d'équipement normal de torpédoplan à la place de l'appareil Blackburn Dart détenant cet place depuis 1920. Un type légèrement modifié et pourvu de moteur Bristol Jupiter se fabrique actuellement dans la Finlande.

Le Ripon est un biplan de deux places equippe de moteur Napier Lion XI, ailerons type Frise, aux fentes conjuguées Handley Page, ailes pliantes, train d'aterrissage oleo-pneumatique de type double, etc. Il se fournit en construction entièrement métallique ou mixte, et en outre l'appareil permet d'être transformé d'un avion terrestre en un hydroplan en substituant simplement les deux flotteurs métalliques par le train d'aterrissage sur roues. Il est conçu principalement comme torpédoplan pour le service de bord, tout en permettant d'être transformé pour le service de bombardement ou de reconnaissance. Son agencement de deux mitrailleuses, en outre du dispositif de lance-bombe, le rend tout à fait capable de se défendre soi-même.

CARACTERISTIQUES.

Poids totale (comme torpédoplan) 3,300 kg., Charge militaire 893, Surface portante 63.7 m.c., Charge par métal carré 51.9 kg./m.c., Charge par CV 5.8 kg./CV, Vitesse maximum à riveau de mer 213 km./h., Vitesse d'atterissage 95 km./h., Vitesse d'ascension depuis niveau de mer 243 m./min., Plafond de service 3,970 m., Rayon 3 heures à pleine puissance.



The Blackburn Ripon III torpedo-carrying biplane (570 h.p. Napier Lion engine). —("Aeroplane" photograph.)

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**The Blackburn Lincock Single-seat biplane (Armstrong Siddeley Lynx engine).**—(*"Aeroplane" photograph.*)

### The Blackburn Lincock.

An accompanying illustration shows one of the latest all-metal Lincocks now in production. This is a development of a type built in 1926 as an endeavour to achieve, in a small, comparatively low-powered single-seater, a performance closely approximating that of the normal high-powered fighter of the present day. The Lincock is the highly successful result, and it is far more manœuvrable, considerably less expensive as regards first cost and very much more economical in operation than aircraft of twice its power.

The first machine, of wooden monococque construction, is still used extensively for demonstration work, and recently, in the hands of Flt. Lt. Atcherley, R.A.F., it added greatly to its reputation at the National Air Races, Detroit, U.S.A. The metal type now in production is being demonstrated in Canada before the R.C.A.F., with a view to its adoption for advanced training, forest fire patrol, survey work, etc., and a number are being supplied to certain Far Eastern countries.

The type of construction used in the metal Lincock is particularly simple and easy to maintain and repair. The fuselage is built in three sections, including the engine mounting, and consists of steel tubular longerons and struts. Tie-rod bracing is used in the sides of one bay only, to facilitate the removal of the petrol tank, and in all other cases diagonal steel tube struts are used. The fuselage joints consist of gusset plates assembled with tubular rivets and bolts.

Special "I" section spars and duralumin ribs are used in the planes. The spars consist of two rolled and drawn high grade steel strip sections rivetted together centrally.

As a fighter the Lincock is fitted with two forward-firing fixed machine-guns mounted one on each side of the pilot inside the cockpit with the barrels projecting through scoops let in the sides of the fuselage. They are fully accessible from the pilot's seat, and the ammunition boxes, fitted between the seat and rudder bar, may be loaded in position and can be easily removed. From the cockpit to the nose the fuselage is covered with aluminium sheet, including removable cowls and cockpit side panels, which give full access to the engine, controls, guns, etc. The pilot's seat is of parachute type and is adjustable. The controls are of normal stick-and-rudder-bar type and a tail-adjusting gear is fitted.

As a power-unit the choice of the Armstrong Siddeley Lynx-Major or Lynx IVc is offered.

SPECIFICATION.

Normal gross weight 2,080 lbs., Total load 1,630 lbs., Wing area 190 sq. ft., Wing loading 10.6 lbs./sq. ft., Power loading 7.4 lbs./h.p., Top speed at 3,000 ft. 162 m.p.h., Top speed at 10,000 ft. 156 m.p.h., Top speed at 15,000 ft. 149 m.p.h., Landing speed 60 m.p.h., Climb from 3,000 ft. to 1,470 ft./min., Service ceiling 22,000 ft.

### Le Blackburn Lincock.

Dans la gravure ci-jointe nous voyons un des types les plus récents d'appareil Lincock de construction entiérement métallique qui se trouve actuellement en production. Cet appareil est un développement d'un modèle construit en 1926 dans le but d'atteindre par un petit monoplace de relativement faible puissance une performance plus au moins égale à celle de l'appareil normal de chasse de forte puissance du jour actuel. L'appareil Lincock en représente le résultat bien réussi, étant à la fois beaucoup plus maniable, beaucoup moins coûteux au point de vue d'achat, et beaucoup plus économique en service par rapport aux avions de deux fois sa puissance.

Le premier appareil, de construction monocoque de bois, s'emploit toujours largement pour les démonstrations et récemment, dans les mains du Flt. Lt. Atcherley, R.A.F., il vient d'ajouter beaucoup à sa réputation lors des National Air Races à Detroit, U.S.A. Le modèle métallique se trouvant actuellement en production fait des démonstrations au Canada devant la R.C.A.F. dans le but d'être adopté pour l'entraînement avancé, patrouillage de garde-feu dans les forêts, pour la topographie, etc., et quelques appareils sont en cours d'etre livrés à des pays le l'extrême Orient.

La construction du Lincock métallique est fort simple et facile à maintenir et réparer. Le fuselage se compose de trois parties, y compris l'installation du moteur, et consiste de longerons en tubes d'acier et des mâts de réunion. De l'entretoisement par tirants ne s'emploit que dans les parois d'une seule travée, pour faciliter le démontage du réservoir d'essence, et en tous autres cas emploi est fait de montants diagonales en tube d'acier. Les joints du fuselage sont réunis par des goussets-cornières fixés par des rivets et des boulons tubulaires.

Dans ces avions, emploi est fait de longerons de section "I" spéciale et de nervures en duralumin. Les longerons se composent de deux pièces profilées, laminés et étirés, en tôle d'acier au carbone, réuns par des rivets au centre.

Le "Lincock," étant un appareil de chasse, est equippé de deux mitrailleuses fixes tirant à l'avant et montées de côté et d'autre de l'aviateur à l'intérieur de la carlingue, les cylindres s'étendant par des creux aménagés dans les parois du fuselage. Ils sont facilement accessibles du siège de pilote et les boîtes de cartouches, logées entre le siège et le palonnier de gouvernail, peuvent soit être ravitaillées à la place, soit être enlevées sans difficulté. De la carlingue jusqu'au nez le fuselage est doublé de tôle d'aluminium, y compris les capots démontables et les parois latérales de la carlingue ainsi donnant accès libre au moteur, au guignols de commande, mitrailleuses, etc. Le siège de pilote est du modèle parachute et est réglable. Les leviers de commande sont du type ordinaire de "manche a balai" et palonnier de gouvernail de direction. Il y est également pourvu un mécanism pour le réglage de la queue

Comme groupe moto-propulseur, l'on offre le choix d'un moteur Armstrong Siddeley Lynx-Major ou Lynx IVc.

Les caracteristiques de cet appareil se trouvent dans la colonne précedente.

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# BOULTON AND PAUL, LTD.

## HEAD OFFICE AND WORKS: NORWICH.

This well-known British engineering firm—founded in 1797—started the manufacture of aircraft during the War, and before the Armistice they had become one of the most important producers of *materiel* for the Royal Air Force.

During the War Boulton and Paul Ltd. turned their attention to the development of all-metal aircraft, and it will probably be remembered that at the seventh *Exposition Internationale de l'Aeronautique* in Paris, in 1919, they exhibited an extremely interesting two-seater aeroplane with a framework constructed entirely from high-tensile steel.

Since this early period the Boulton and Paul system of metal construction has been developed far past the experimental stage. The essential feature of the system is the employment of a limited number of standard sections, rolled or drawn from thin strip material, which are capable of being combined one with another to form a range of members suitable for practically every structural part of any type of aeroplane from the smallest of light aeroplanes to the largest of heavy bombers or commercial aircraft.

An outstanding example of aircraft constructed by this system is the Boulton and Paul Sidestrand, a twin-engined bomber which is probably unsurpassed by any other machine of a similar class in respect of performance, manœuvrability and military effectiveness.

Probably the most generally interesting section of the Boulton and Paul exhibit at the forthcoming Paris exhibition will prove to be that relating to the Boulton and Paul Townend Ring. This device, which is of extreme simplicity, consists of a metal ring, similar in section to an aerofoil, which surrounds the cylinders of a radial air-cooled engine. When correctly proportioned and arranged, it has the effect of reducing the resistance caused by such an engine to a small fraction of the resistance caused by the same engine when fitted with the usual type of cowling. This reduction in the resistance of this type of engine results in a very marked improvement in the performance of the aeroplane to which the device is fitted, an increase which depends on the characteristics of the particular machine, but which may amount in the case of a single-seat fighter to as much as 15 m.p.h.

This result is of first-rate importance to the makers and users of radial air-cooled engines. It permits of the full employment of the undoubted advantages of the radial engine without suffering from the one serious disadvantage of high resistance.

The importance of the economies which are attainable by the use of the Boulton and Paul Townend Ring may be gauged from the fact that for the maintenance of a given speed a saving in power of from 20-25% may be effected by the fitting of this device.

Ces ateliers de constructions mécaniques bien connus—établis en 1797—ont commencé la fabrication des avions au cours de la guerre et avant que l'armistice ne fut conclue la firme s'était acquise une place au premier rang parmi les fabricants de matériel pour le R.A.F.

Pendant la guerre, Boulton et Paul Ltd. se jetèrent sur le développement des avions de construction entièrement métallique, et on se rappellera sans doute que lors de la septième Exposition Internationale de l'Aéronautique à Paris en 1919 ils exposèrent un avion biplan fort intéressant comportant une charpente fait entièrement en acier de haute résistance.

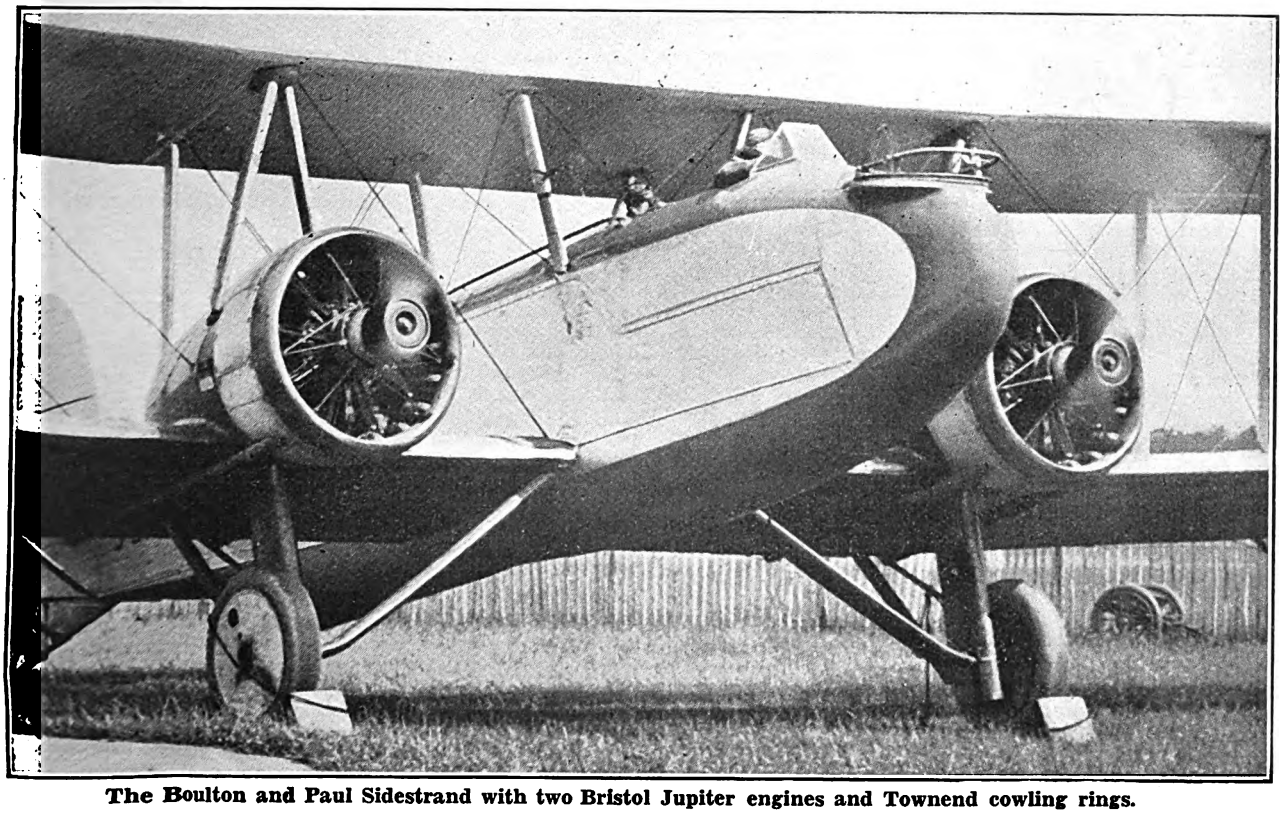
Depuis ces premiers temps le système Boulton et Paul de construction métallique a été porté bien au delà de l'état expérimentel. L'essentiel de cette construction est l'emploi d'un nombre réduit de sections normales laminées ou étirées de matériel à faible épaisseur en forme de bande, lesquelles permettent d'être combinées l'une avec l'autre pour former une gamme de pièces convenant à peu près pour tous éléments de carcasse de n'importe quel modèle d'avion, des avions légers les plus petits jusqu'aux appareils de bombardement ou avions commerciaux gros porteurs.

Un exemple notable d'avion construit suivant ce système est le Boulton et Paul Sidestrand, appareil de bombardement à deux moteurs, sans doute non-surpassé par n'importe quel autre appareil de même catégorie au point de vue de performance, maniabilité et efficacité militaire.

La partie de l'exposition Boulton et Paul probablement la plus intéressante d'un ordre général doit être celle ayant trait à l'anneau Boulton et Paul "Townend." Ce dispositif, de simplicité extrême, se compose d'un anneau métallique, en section d'aérofoil, et entourant les cylindres d'un moteur en étoile à refroidissement par air. A condition qu'elle soit bien dimensionnée et convenablement disposée, elle a pour effet de réduire la résistance entraînée par un tel moteur à une petite fraction de celle à laquelle le même moteur donne lieu lorsqu'il est muni du capotage ordinaire. La réduction de résistance que comporte ce modèle de moteur conduit à une amélioration marquée dans la performance de l'avion agencé du dispositif, l'augmentation dépendant des caractères généraux de l'apparail particulier; l'importance de cette amélioration, cependant, dans le cas d'un avion monoplace de chasse peut s'élever à autant que 25 km.p.h.

Ce résultat est d'importance du plus haut degrée aux fabricants de moteurs en étoile à refroidissement par air, et à tous ceux qui s'en servent. Il permet d'exploiter les avantages indisputables du moteur en étoile à fond sans être affecté de l'un désavantage sérieux, celui de grande résistance.

On peut se faire une idée de l'importance des économies realisés au moyen de l'anneau Boulton et Paul "Townend" du fait que des économies de puissance de 20-25% ont été obtenues en montant ce dispositif, tout en maintenant une vitesse donnée.



**The Boulton and Paul Sidestrand with two Bristol Jupiter engines and Townend cowling rings.**

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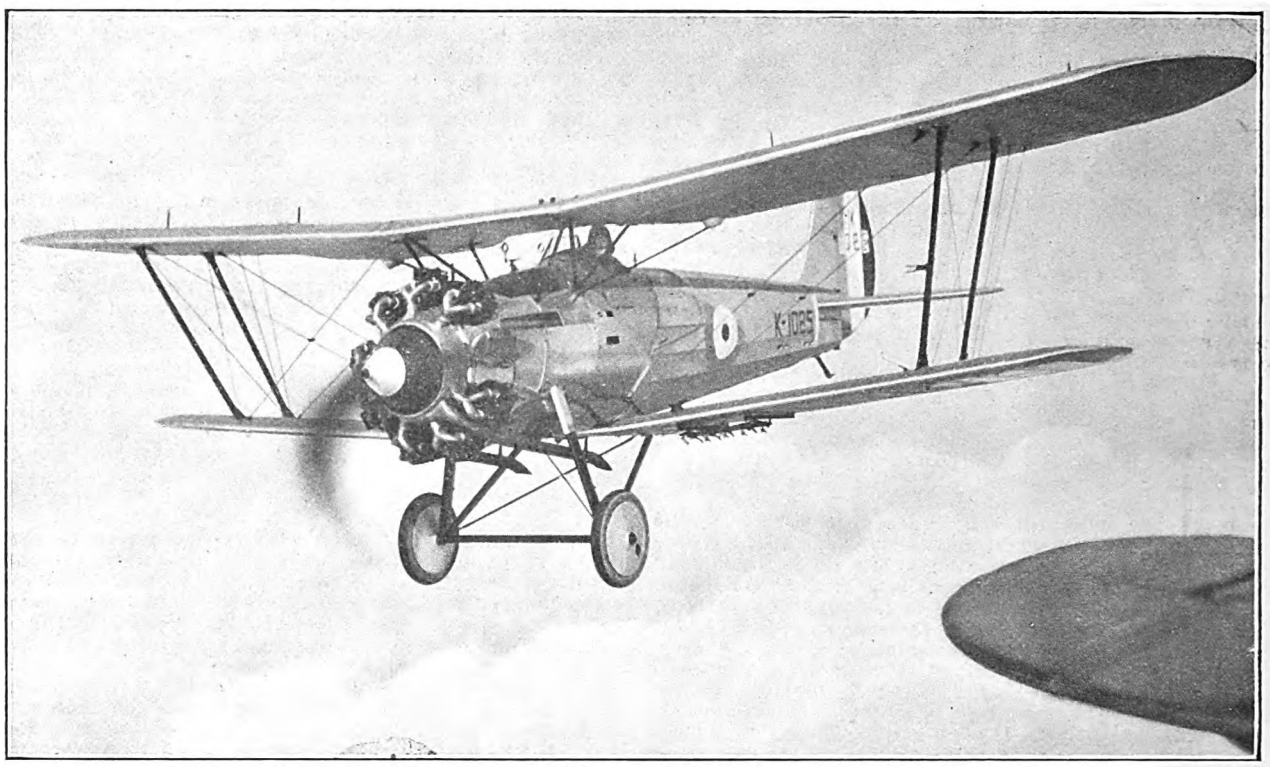
# THE BRISTOL AEROPLANE CO. LTD.

**HEAD OFFICE AND WORKS: FILTON, BRISTOL.**



**The Bristol Bulldog biplane (Bristol Jupiter engine).**—(*"Aeroplane" photograph.*)

### The Bristol Bulldog.

The latest and most important product of the Bristol Aeroplane and Motor Co. Ltd. is the Bulldog high performance single-seat fighter biplane.

The Bulldog has been adopted as standard fighter equipment for certain fighter squadrons of the R.A.F. Similarly it has been adopted by the Royal Australian Air Force and it has also been chosen for the equipment of the Air Forces of nine different countries including Sweden, Denmark, Latvia, Estonia, Siam etc.

In the design of the machine the closest attention has been paid to ensuring the greatest ease in upkeep and maintenance and the metal structure is one that lends itself to ease of repair in the field, an extremely important feature in military aircraft.

The Bulldog is a single-bay tractor biplane which can be fitted with either the Bristol Jupiter Series VII F supercharged engine, when exceptional speed and performance at high altitudes are specially required, or with the Bristol Jupitor Series VI F engine when the normal operating area of the machine is not expected to exceed 15,000 ft. These two types of engines are easily interchangeable.

The structure of the machine is of steel with fabric covering for the wings, tail-unit and rear half of the fuselage. The forward portion of the fuselage is covered with quickly detachable metal panels.

The pilot's view is good in all directions. The trailing-edges of the top and bottom wings and centre-section near the fuselage are cut away and the top centre-section is of a thinner section than the rest of the wings. From the windscreen the nose of the body slopes downwards thus giving a good forward view. The pilot's seat, which is arranged to accommodate the standard seat type parachute, is adjustable up and down over a range of 4½ inches and it may be locked in any position.

The armament consists of two fixed Vickers machine guns which are mounted in troughs in the sides of the cowling one on either side of the fuselage.

Full short-wave R/T wireless apparatus is carried with fixed external aerial and other equipment includes oxygen apparatus, parachute, pilot's harness, full electrical equipment for night flying, signal pistol and cartridges etc.

A complete repair scheme has been developed for this aircraft. Standard repair patches which are rivetted over the injured strut, spar, rib or longeron are provided. Small hand tools are available to allow repairs to be made with these patches without the need for specially skilled work. A simple jig is obtainable to cut and drill to size any tubular members of the forward part of the fuselage that may be required to be replaced.

### Le Bristol Bulldog.

Le dernier modèle, et le plus important évolue par la société Bristol est le Bulldog. biplan biplace de chasse à haut rendement.

Le Bulldog e été adopté pour l'équipement standard de certaines escadrilles de chasse de la Royal Air Force. Il a été choisi aussi par la Royal Australian Air Force, et par les Aéronautiques de neufs pays différentes y compris la Suède, le Danemark, la Latvie, l'Estonie, le Siam, etc.

Les plus grandes études ont été apportées à la question de facilité d'entretien, et la construction métallique se prête aux réparations rapides en service, détail très important pour les appareils militaires.

Le Bulldog est un biplan tractif à une travée, qui peut être équipé du moteur Bristol Jupiter VIII F, à compresseur, lorsque une grande vitesse et performance aux hautes altitudes sont désirées, ou du moteur Bristol VI F, lorsque la zone normale d'opérations ne dépasse pas 4,570 m., Ces deux modèles ont une interchangeabilité facile.

La structure de l'appareil est métallique avec revêtement en toile des ailes, de l'empennage, et de la partie arrière du fuselage. La partie avant comporte un capotage métallique en panneaux amovibles.

Les vues du pilote sont excellentes dans toutes les directions. Les bords de fuite des ailes supérieures et inférieures et la partie centrale en proximité du fuselage sont échancrés, et le profil de la partie centrale supérieure est plus mince que le reste. Du pare-brise le nez de l'appareil s'incline vers le bas, permettant ainsi une grande vue en avant. Le siège du pilote, qui est aménagé pour le siège parachute standard, est réglable verticalement sur un écart de 11.5 cm. est peut être bloqué selon besoin.

L'armement consiste de deux mitrailleuses Vickers fixes, montées en caniveaux dans de capotage à chaque côté du fuselage.

L'équipement comporte un appareil de T.S.F. à ondes courtes, avec antenne fixe extérieure, le harnais de parachute du pilote, un dispositif électrique complet pour vol de nuit, pistolet à signaux avec cartouches, etc.

Un système complet de réparation à été établi pour cet appareil. Des plaques standard sont prévues qui sont appliquées à rivets aux éléments avariés. De simples outils à main sont disponibles, permettant des réparations avec ces plaques sans le besoin de main d'oeuvre spécialiste. L'équipement comporte aussi un outillage pratique pour découper et percer à dimension les elements tubulaires de la partie avant du fuselage qui seraient à remplacer.

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### The Bristol Jupiter Engine.

The Bristol Jupiter engine is probably the most famous air-cooled radial engine in the World. At the present moment engines of this type are being built under licence in France, Italy, Germany, Belgium, Czechoslovakia, Jugoslavia, Portugal, Switzerland, Hungary, Spain, Poland, Japan, the U.S.A. and Canada and it can be quite safely said that more Jupiter engines have been built than any other design of engine.

The characteristics of the Jupiter engine which have secured for it so universal an approval are its low weight per h.p. and its remarkable and consistent reliability under all conditions of service.

All Jupiter engines are of similar general design. Yet by variation in detail such as the use of a number of different compression ratios, the use of either direct airscrew drive or the fitting of a reduction gear and the use of a supercharger either of the full or moderate type, this single type of engine is produced with a range of performance suiting it for service in all types of aircraft.

The latest models of the Jupiter series are the Series X.F. and X.F.A., which are high altitude engines differing only in the ratio of the airscrew reduction gear and the Series X.F. AM. and X.F. BM. which are basically similar to the Series X.F. with the important exception that the supercharger is of the moderate speed type, the impellor running at only 70 per cent. of the speed of the Jupiter X.F. impellor, and permitting full throttle operation at approximately 4,000 to 5,000 feet.

The Bristol Jupiter X.F. service engine has been in existence for some time, and has been fitted to new types of service aircraft. The Jupiter X.F. AM. and X.F. BM. engines are new developments intended for use with general purpose service machines, seaplanes, and certain commercial machines and air liners operating over routes which involve the crossing of mountainous districts and the taking off, with full load, from aerodromes in these districts.

The latter type engines have been selected by Imperial Airways Ltd. for their new four-engined machines for the London-Capetown route.

The "F" type engine has now been in production for over 12 months, and during that time steady development has taken place involving detailed improvements throughout the engine. The combined result of this development has been a pronounced increase in performance and reliability, which has been demonstrated by a series of Type Tests made at full throttle and maximum r.p.m., instead of the customary 90 per cent. throttle and normal r.p.m. These tests have been concluded with complete success, the latest engine to fulfil these strenuous requirements being the new moderately supercharged geared engines for Imperial Airways Ltd., which developed approximately 570 b.h.p. throughout the test. Economy of fuel and oil consumption, particularly under normal operating conditions, has not been neglected. The former is cared for by the new pump type carburettor with power jet, which permits economy under cruising conditions with a rich mixture for take-off, and the latter by improved methods of finishing cylinder bores and detailed improvements to pistons and piston rings.

### Le Moteur Bristol Jupiter.

Le moteur Bristol Jupiter est probablement le moteur en étoile, à refroidissement par air, le plus célèbre au monde. En ce moment, des moteurs de cette marque sont en construction, sous license, en France, en Italie, en Allemagne, en Belgique, en Tchekoslovakie, en Yougoslavie, au Portugal, en Suisse, en Hongrie, en Espagne, en Pologne, au Japon, aux Etats Unis, et au Canada.

Les caractéristiques du Moteur Jupiter, qui lui ont valu une approbation si universelle, sont son poids léger par rapport à sa puissance et sa sûreté remarquable et constante sous toutes conditions de service.

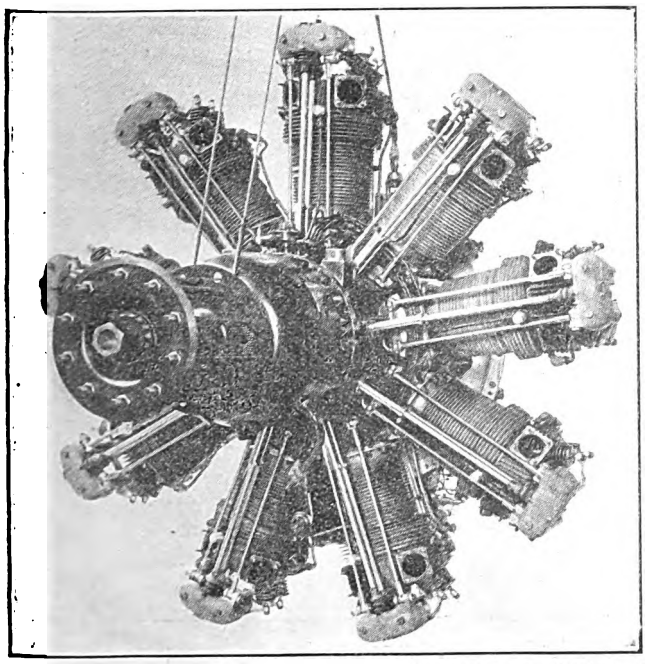
Tous les moteurs Jupiter sont semblables en construction générale. Toute fois en variant les details, comme l'emploi d'un nombre de différents rapports de compression, l'entrainement directe de l'hélice ou par démultiplieur, l'usage d'un compresseur ordinaire ou à vitesse reduite, ce seul modèle de moteur est produit avec un si grand écart de performance qu'il est adaptable à toutes classes d'avions.

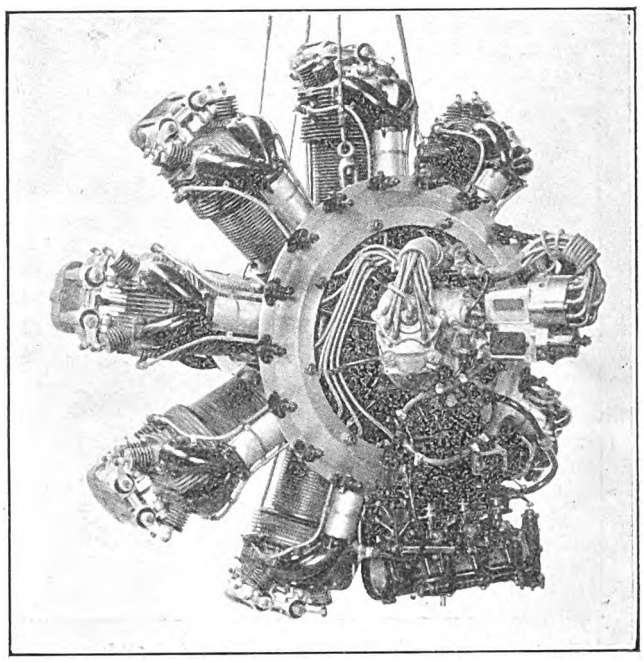
Les modèles les plus nouveaux des moteurs Jupiter sont les séries X.F. et X.F.A., qui sont des moteurs pour hautes altitudes, différent seulement par leurs rapports de l'engrenage de reduction de l'hélice, et les séries X.F. AM. et X.F. BM. sont essentiellement semblables à la serie X.F., mais avec l'importante exception que le compresseur est du type à vitesse modérée, l'impulseur ne tournant qu' à 70 pour cent de la vitesse de celui du Jupiter X.F., permettant d'opèrer à plein gaz à environ 1,200 à 1,600 m.

Le moteur Bristol Jupiter X.F., service militaire, est en construction depuis quelque temps, et il est monté sur des nouveaux types d'avions militaires. Les moteurs Jupiter X.F. AM. et X.F. BM., sont de nouveaux développements construits pour avions militaires de servitude, hydravions, certains avions de transport, opérant sur des routes montagneuses ou il faut décoller avec plein chargement.

Ce genre de moteur a été choisi par les Imperial Airways pour leurs nouveaux avions à quatre moteurs opérant sur la route de Londres au Cap.

Le moteur genre "F" est maintenant en fabrication depuis un an. Pendant ce temps un développement continu a eu lieu, comportant une mise au point dans le moteur entier. Il en resulte une amélioration prononcée en puissance et en sûreté de fonctionnement, démontrée par une serie d'essais de type à plein gaz et au maximum de tours, au lieu de 90 pour cent de gaz et tours normals comme à l'ordinaire. Ces essais ont été achevés avec un succès complet, les moteurs les plus récents venant d'accomplir cette tâche difficile étant ceux pour les Imperial Airways, à compresseur à vitesse réduite, et démultiplié. Ils developpèrent une puissance d'environ 570 CV pendant la durée entière des épreuves. La consommation économique d'essence et d'huile, surtout dans les conditions d'operations normales a été aussi étudiée. La consommation d'essence est réglée par le nouveau modèle de carburateur à pompe avec jet spécial pour sur-puissance, qui permet d'économiser l'essence en marche tout en donnant un mélange riche pour le décollage. La consommation d'huile est réduite par une méthode améliorée de finir l'alésage des cylindres et par la mise au point des pistons et de leurs anneaux.





The Bristol Jupiter X.F. radial air-cooled engine.

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# CIRRUS AERO-ENGINES LTD.

**HEAD OFFICE AND WORKS: PURLEY WAY, WADDON, SURREY.**

The remarkable success of Cirrus engines and their contribution to the development of light aircraft has resulted from the Cirrus policy of producing engines after careful research and experiment, incorporating the highest standards of material and workmanship, and establishing adequate service facilities all over the World.

### 105/115 h.p. Cirrus-Hermes Mark II.

The 105/115 h.p. Cirrus-Hermes four-cylinder-in-line air-cooled engine has been developed to meet the demand for an engine of higher power than the Cirrus Mark II or Mark III. The latest Cirrus-Hermes can be supplied either in the standard or inverted form. In the latter state it has passed all the proper type tests and been flown for some hundred of hours.

Except where indicated, the standard and inverted engines are both similar, so the following outline specification covers both.

The cast-iron heavily-finned cylinders have detachable aluminium alloy heads. These are held in place by long studs, which pass through the cylinder fins and are held in place in the crankcase. The aluminium-bronze seatings for the one inlet and one exhaust valve per cylinder are screwed and expanded into position.

Phosphor-bronze valve-guides are a force-fit in the head, and bronze sparking-plug adapters are screwed into place.

The pistons are aluminium alloy castings with three rings. The gudgeon-pin is of the fully floating type, and the steel connecting-rods are machined all over.

The one-piece crankshaft revolves in five die-cast bearings, and the thrust of the airscrew is taken by a large journal ball-bearing in the nose of the crankcase. This is an aluminium alloy casting, the cylinder-half of which carries the crank-shaft bearings and the timing gears. Thus the bottom part in the standard types, or the cover in the inverted type, is either an oil sump or cover for the moving parts. In the latter type it is made of electron.

The standard type has a wet-sump lubricating system. The inverted type has a dry sump system and is pressure-fed throughout by a delivery pump from the oil-tank.

SPECIFICATION.

Compression ratio (standard and inverted) 5.1 to 1, Dimensions (standard), Length overall 978 mm., Width 482 mm., Height 916 mm., Bearer centres 540 mm., Dimensions (inverted), Length overall 1,077 mm., Width 478 mm., Height 739 mm., Bearer centres 540 mm., Weight dry (standard) 300 lbs. (inverted), 305 lbs., Performance (standard and inverted), Normal output 105 b.h.p. at 1,000 r.p.m., Maximum output 115 b.p.h. at 2,100 r.p.m., Fuel consumption .058 pint per b.h.p. hour (at cruising speed), Oil consumption 1 pint per hour.

Le succès remarquable des moteurs "Cirrus," et leur aide dans l'évolution des avions légers, représente un résultat des principes Cirrus de produire les moteurs à la suite d'études et d'essais soigneusement faits, et de ne faire emploi que de matières premières et d'une main-d'œuvre de la plus haute classe, ainsi que d'assurer une diffusion du service d'entretien en tous coins du monde.

### Moteur "Cirrus-Hermes," modèle II, 105/115 CV.

Le groupe moto-propulseur "Cirrus-Hermes II" de 105/115 CV. à quatre cylindres en ligne a été évolué pour satisfaire aux demandes pour un moteur d'une puissance plus élevée que le modèle "Cirrus II" ou "Cirrus III." Le modèle le plus récent de moteur "Cirrus-Hermes" se fournit soit en forme normale, soit inversée. Dans la variante dernière il a subi toutes les épreuves du type normal et a fonctionné en vol effectif quelques centaines d'heures.

Apart les exceptions indiquées, les moteurs normaux et inversés sont pareils; ainsi les caractéristiques générales suivantes s'appliqueront à tous les deux.

Les cylindres en fonte, entourés par de larges ailettes de refroidissement, sont surmontés par des culasses démontables en alliage d'aluminium. Celles-ci sont fixées par de longs prisonniers passant à travers les ailettes et vissés dans le carter de vilebrequin. Les sièges en bronze d'aluminium pour l'unique soupape d'admission et d'échappement de chaque cylindre sont vissés en position à chaud. Les guides de soupape en bronze phosphoreux sont emmanchés dans la culasse à force, et les manchons en bronze faisant logement pour les bougies sont vissées en position.

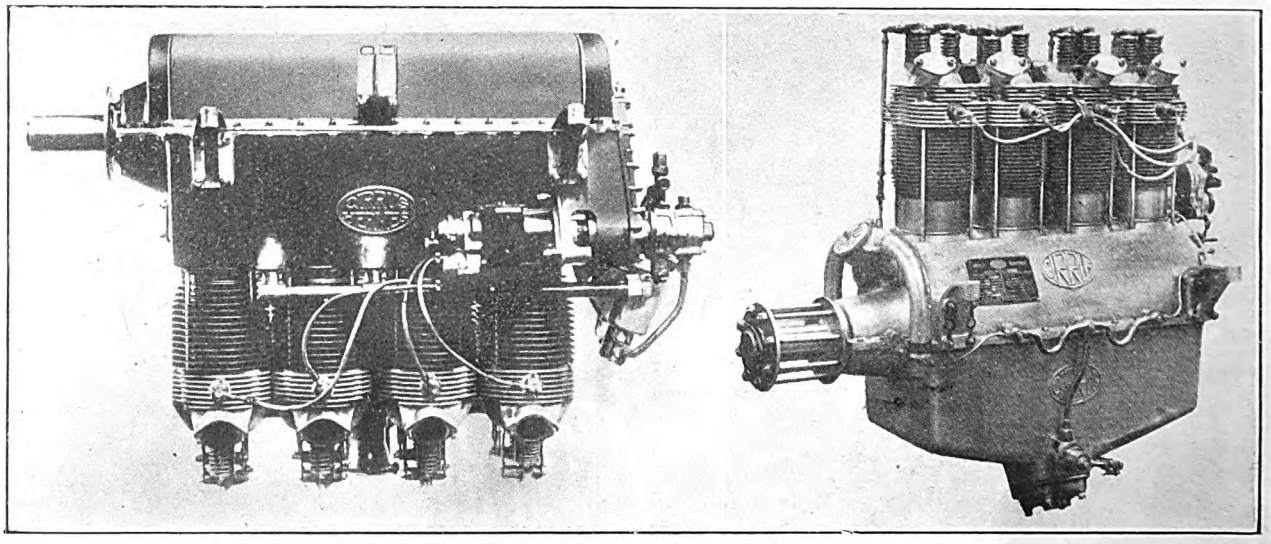
Les pistons sont coulés en alliage d'aluminium et équipés de trois bagues. L'axe de piston est du type à déplacement libre et les bielles en acier sont entièrement usinées.

Le vilebrequin en une seule pièce tourne en cinq paliers coulés en coquille, la butée de l'hélice étant absorbée par un roulement à billes robuste logé dans le nez du carter de manivelle. Ceci est un bloc coulé en alliage d'aluminium, dont la partie comportant les cylindres porte les paliers de l'arbre-vilebrequin, ainsi que les engrenages de distribution. Ainsi la partie inférieure dans le type normal, ou bien le couvercle dans le modèle inversé, forme soit un réservoir d'huile soit un couvercle pour les parties mobiles. Dans ce dernier cas il est exécuté en électron.

Dans le type normal, le graissage est à barbotage, tandis que le modèle inversée comporte un système de lubrification par huile sous pression livrée par une pompe puisant dans le réservoir d'huile.

CARACTERISTIQUES GENERALES.

Taux de compression (normal et inversé): 5.1: 1, Dimensions: Longeur totale 978 mm. (normal), 1,077 mm. (inversé). Largeur 482 mm. (normal), 478 mm. (inversé. Hauteur 916 mm. (normal), 739 mm. (inversé). Supports espacés de 540 mm. (normal), 540 mm. (inversé). Poids à vide: normal 136 kilos, inversé 138 kilos. Performance (normal et inversé): Puissance normale 105 CV. au frein à 1,000 tours/min. Puissance maximum 115 CV. au frein à 2,000 tours/min. Consommation de combustible 0.32 litres par CV./heure (à vitesse croisière). Consommation d'huile 0.56 litres/heure.



**On the left the inverted and on the right the upright Cirrus-Hermes engine.**

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# THE CIVILIAN AIRCRAFT CO., LTD.

## HEAD OFFICE AND WORKS: BURTON-ON-TRENT.

The Civilian Aircraft Co. Ltd. is one of the latest aircraft constructing firms to be established in Great Britain and its first production is the Civilian Coupé two-seat cabin monoplane.

This machine has been designed by Mr. H. D. Boultbee who is also a director of the company.

The company has had an experimental machine flying for eighteen months and although the design was highly successful from the first, every effort has been made to make certain that the machine was absolutely ready before placing it on the market. The Coupé is fitted with the 75 h.p. A.B.C. Hornet four-cylinder horizontally-opposed air-cooled engine. The A.B.C. Hornet engine is being fitted as the standard engine and it was only after the Civilian company had satisfied themselves that the engine was thoroughly sound and reliable that they decided to take this step. At extra cost however the Armstrong Siddeley Genet radial air-cooled engine may be supplied as an alternative power plant.

The Civilian Coupé is a braced folding wing monoplane with enclosed accommodation for two people.

The wings are of wooden construction and are covered with plywood. They are attached to a steel tube structure which forms the framework for the upper portion of the cabin and are braced to the bottom of the fuselage by Vee struts. They are arranged to fold round the rear spar joints and the apices of the Vee bracing struts are located directly below the spar hinges so that it is only necessary to release the quick release pins on the front spar joints to fold the wings.

The fuselage is of mixed construction. The forward portion, where the principal loads are concentrated, is made of steel tubes bolted together. The rear portion consists of a spruce framework covered with plywood. The whole of the fairing on the top of the rear portion is easily detachable to allow for the inspection of the controls, etc.

The undercarriage is of the divided type and consists of two compression legs incorporating rubber-in-compression springing the top ends of which are attached to the top fuselage longerons and the bottom ends hinged to the bottom fuselage longerons.

The cabin seats two in staggered seats which give sociability without excessive width to the cabin. The seats are of the bucket type and are exceptionally comfortable. The pilot's seat is adjustable. The most noticeable feature of the machine is the view from the pilot's seat. Windows are provided all round the cabin giving a complete circle of vision on eye level and below. A large window in the centre-section together with tapered wing roots allows the pilot to see above the wing by slightly banking the machine.

There is a large door on the left side of the cabin. All controls are of the push-pull rod type and run on ball-bearings and oil-less bushes throughout.

With the Hornet engine the Coupé has a top speed of 105 m.p.h. and a cruising speed of 85 m.p.h. With the Genet engine the top speed is 116 m.p.h., and the cruising speed 96 m.p.h. The landing speed is 36 m.p.h. With the Hornet engine and normal tanks the range at cruising speed is 360 miles or 4½ hours.

La Civilian Aircraft Company est l'une des dernières à entrer dans le champs de construction d'avions, et sa première création est le Civilian Coupé monoplan biplace.

Cet appareil a été conçu par M. Boultbee, qui est aussi un des membres du conseil d'administration de la société.

La société réalisa un appareil d'essai il y a dix-huit mois, et bien qu'il eut un grand succès dès le début, tous les soins ont été apportés afin de prouver ses qualités avant de le mettre en vente. Le Coupé est muni d'un moteur A.B.C. Hornet, de 75 CV., à cylindres vis à vis, et refroidis à l'air.

Le moteur A.B.C. Hornet est devenu l'équipement standard de l'appareil, après que la société se fut décidee par des essais prolongés que ce genre de moteur possédait le plus grand ensemble de qualités. L'installation d'un moteur Armstrong Siddeley Genet, en étoile avec refroidessement par l'air, comporterait une augmentation de prix.

Le Civilian Coupé est un monoplan à cabane aux ailes repliables, biplace à conduite intérieure.

Les ailes sont construites en bois, revêtues de contreplaqué. Elles sont rattachées à une structure en tubes d'acier qui forme la partie supérieure de la cabine, et elles sont ancrées au bas du fuselage par des mâts en V. Elles sont repliables aux points d'attache des longerons de fuite, et les sommets des mâts en V sont directement en dessous des charnières de ces longerons. Il est donc seulement nécessaire de libérer les déclics des joints des longerons d'attaque pour replier les ailes.

Le fuselage est de structure mixte. La partie en avant, où sont concentrées les masses principales, est de tubes en acier boulonnés. La partie en arrière est en spruce cloisonné et recouvert de contreplaqué. Tout le carénage dorsal de cette partie est amovible pour permettre l'éxamen des commandes etc.

Le train d'atterrissage est articulé et sans essieu, et l'amortissement des deux jambes est par caoutchouc en compression. Elles sont rattachées aux longerons supérieurs et inférieures du fuselage.

Les deux sièges baquet décalés permettent un grand confort sans trop élargir la cabine, et celui du pilote est adjustable. Les vues du pilote sont excellentes. Des fenêtres sont aménagées tout autour de la cabine, donnant un cercle de visibilité entier au niveau des yeux et en dessous. Une grande fenêtre dans la partie centrale de l'aile qui est, d'ailleurs, fuyante aux points d'encastrement, permet au pilote de voir au dessus de l'aile en virant légèrement l'appareil.

Une grande porte à gauche donne accès a la cabine. Toutes les commandes sont rigides sur des coussinets à billes à bagues sans graissage.

Muni du moteur Hornet, le Coupé a une vitesse maxima de 168 k.p.h. et une vitesse croisière de 136 k.p.h. Avec le moteur Genet les vitesses sont de 185.6 k.p.h. et de 153.6 k.p.h. respectivement. La vitesse d'atterrissage est de 57 k.p.h. Les réservoires ordinaires permettent, avec le moteur Hornet un rayon de 576 km., à vitesse croisière, ou une durée de 4½ heures.

The Civilian Coupe monoplane (75 h.p. A.B.C. Hornet engine).

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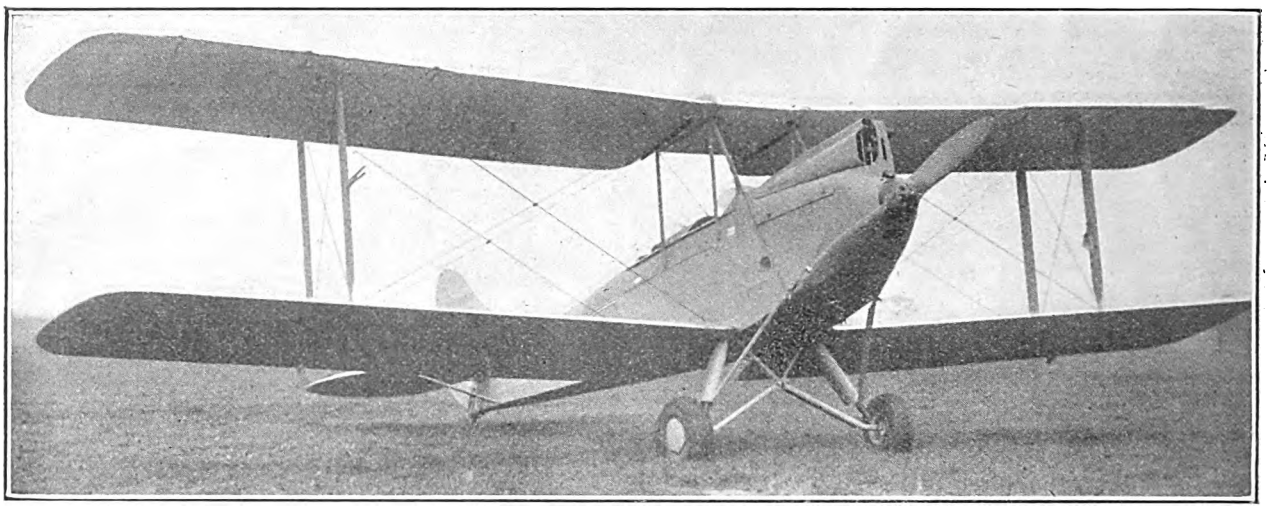
# THE DE HAVILLAND AIRCRAFT CO., LTD.

**HEAD OFFICE AND WORKS:—STAG LANE AERODROME, EDGWARE, LONDON, N.W.**



**The 1931 D.H. Gipsy Moth biplane (100 h.p. D.H. Gipsy I engine).** —(*"Aeroplane" photograph.*)

The De Havilland Aircraft Co., Ltd. has since its establishment in 1921 devoted practically all its attention to the development of civil aircraft. Of the long line of successful De Havilland aircraft two types—the D.H. Gipsy-Moth and the D.H. Puss-Moth—stand out very prominently.

In the hands of both professional and amateur pilots the Moth has been flown all over the civilised World and it has proved itself to be the most versatile aeroplane that exists to-day. To give a list of the famous flights made by the Moth would take up too much space here and although these flights are very convincing and do help to prove the dependability of the type they would only represent a very small proportion of vast amount of flying that has been done with the Moth although in long distance flights in 1930 alone the Moth has flown the equivalent of three and a half times round the World. It is estimated that the Moth has now flown over 15 million miles in all parts of the World and it is this general flying done under every known type of condition of civil aviation, in extreme of temperature, as landplane or seaplane and doing the regular work that was done previously by aeroplanes of three and four times the horse-power that really proves the efficiency of the machine.

Each year a new model of the Moth has been produced which has had incorporated in it the various improvements and modifications which have been suggested by the previous year's experience with the type.

### The Gipsy-Moth.

The 1931 Gipsy-Moth is a standard single-bay folding wing biplane of the type that has been famous all over the World as the pioneer light aeroplane. Two models are made one of which is known as the Standard model and the other as the Special model. These two models are essentially similar but the latter has a welded steel-tube fuselage in place of the wooden structure used on the Standard model. They may be fitted with either the 100 h.p. Gipsy I or the 120 h.p. Gipsy II engine.

The structure of the wings is of wood with fabric covering and the wings are arranged to fold round the rear spar hinges to enable the machine to be stored in a space equivalent to that of an ordinary automobile. Ailerons with the D.H. differential system of control are fitted on the bottom planes and Handley Page automatic slots may be fitted to the top planes.

In the 1931 Gipsy-Moth a modified undercarriage incorporating new axles and special 19 in. by 7 in. Dunlop air wheels running on ball bearings. Intensive and prolonged experiment has been made with this equipment which has been specially designed for the Gipsy-Moth. The new undercarriage appears to absorb the shock of the most brutal landings and it will undoubtedly reduce greatly the number of minor accidents especially at Flying Clubs and Schools where indifferent landings are frequently made. The wide section of the air wheel has a pronounced advantage on muddy or rough ground and the ball bearings, being packed with grease, will require little maintenance attention.

Depuis son établissement en 1921, la société de Havilland s'est dévoué presque entièrement au developpement d'avions civils. De la langue série d' appareils réussis de Havilland deux modèles—le D.H. Gipsy-Moth et le D.H. Puss-Moth—enressortent très nettement.

Dans les mains de pilotes de profession ou amateur les Moths ont volé partout, et ils sont vraiment les avions les plus versatiles au monde à present. Donner une liste des raids célébres du Moth occuperait trop de place ici, et bien que ces vols soient trèe convaincants et démontrent la sûreté du type, ils ne représenteraient qu'une faible proportion de tous les vols accomplis par le Moth. Il est à noter, cependant, que seul les vols à long parcours en 1930 du Moth représente une distance de deux fois et demie autour du monde. Il est calculé que les tous les Moths du monde ont volé plus de 24 millions de kilomètres, et c'est justement cette aviation ordinaire, faite sous toutes les conditions imaginables d'extrêmes de température par dessus la mer aussi bien que la terre, et achevant le même travail que faisait des appareils plus forts, qui prouve le rendement étonnant du Moth.

Chaque année a vu la présentation d'un nouveau modèle du Moth, perfectionné par l'inclusion des différentes modifications inspirées de l'expérience des avions précédents.

### Le Gipsy-Moth.

Le Gipsy Moth modèle 1931 est un biplan à une travée avec les ailes repliables, du genre qui s'est rendu célèbre au monde entier comme le premier avion léger. Deux modèles sont construits, l'un, le Standard Model, et l'autre le Special Model. En essentiels ces deux appareils se ressemblent mais le dernier a un fuselage de tubes en acier soudés au lieu de la structure en bois du premier. Ils peuvent être munis du moteur Gipsy I à 100 CV au du Gipsy II, à 120 CV.

La construction des ailes est en bois avec recouvrement en toile, et elles sont destinées à replier contre les charnieres les longerons de fuite, pour permettre l'appareil d'être garagè dans un espace pas plus grand que ce que prend une automobile. Les ailerons inférieurs sont munis du système différentiel de commande D.H., et les fentes automatiques Handley Page peuvent être installées sur les ailes supérieures.

Le Gipsy-Moth modèle 1931 est muni d'un train d'atterrissage modifié, ayant des essieus nouveaux et des roues spéciales Dunlop, 483 mm. by 178 mm., (19 in. by 7 in.), à roulement à billes. Des essais prolongés ont été faits avec cet équipement qui a été spécialement établi pour le Gipsy-Moth. Le nouveau train d'atterrisage semble absorber les chocs les plus rudes, et réduira certainement le nombre d'accidents légers, surtout aux Flying Clubs et aux centres d'entrainement, où des atterissages médiocres surviennent souvent. La large section des pneus facilite aussi les manœuvres sur les terrains mauvais, et les erussinets à billes, rembourrés de graisse, de mandent peu d'entretien.

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The cockpits are of the tandem open type but a special coupé head may be supplied which enables the machine to be flown in comfort in the coldest weather without the need of special clothing.

Complete dual controls are fitted but the front control column may be removed when its use is not required.

Several important modifications affecting the comfort of the occupants are being incorporated in the 1931 model.

A new type three-piece unsplinterable glass windscreen will be fitted to the pilot's cockpit which will result in increased visibility and greater comfort.

A three-ply detachable cover will be provided for the front cockpit in conjunction with a quickly detachable front windscreen.

A 6/18 Hughes Mk. IIIA Aperodic compass and a dashboard watch and holder will be added to the standard equipment of the machine.

At a normal loaded weight of 1,550 lbs. the Gipsy-Moth with the Gipsy I engine has a top speed of 100 m.p.h., a cruising speed at 1,000 ft. of 91 m.p.h., and a stalling speed of 44 m.p.h.

The same machine with the Gipsy II engine has a top speed of 107 m.p.h., a cruising speed at 1,000 ft. of 91 m.p.h., and a stalling speed of 44 m.p.h.

The Gipsy-Moth may also be fitted with twin long single-step metal floats of Short design and large numbers of Gipsy-Moth seaplanes are operating all over the World with great success.

### The Puss-Moth.

In 1930 the De Havilland company produced the Puss-Moth, not as a successor of the Gipsy-Moth but to fill a demand for a more luxurious type of light aeroplane. This demand was created by the remarkable growth of private flying stimulated by the Flying Clubs and by the number of flying schools offering cheap instruction on economical light aeroplanes.

During its comparatively short existence the Puss-Moth has made a name for itself. It provides comfort of a type hitherto only associated with the saloon automobile and in spite of being a cabin aeroplane the vision from the cabin, aided by the transparent roof, ample windows all round and a very narrow nose cowling, is better than that provided in any other aeroplane.

The Puss-Moth has a very high top speed and cruising speed and its general high all-round performance has been amply demonstrated by the remarkable flights by Mr. C. D. Barnard from London to Malta, non-stop and back, a distance of 2,800 miles (4,505 km.) in 27½ flying hours, and from London to Tangier, non-stop and back, a distance of 2,400 miles (3,862 km.) in 23 flying hours.

The 1931 Puss-Moth has had several important additions and refinements added to it to bring it into line with the high standard of development consistently maintained by the De Havilland company.

In general arrangement the Puss-Moth is a two or three-seat cabin) high wing braced monoplane fitted with the 120 h.p. D.H. Gipsy III inverted engine.

The wings are of wooden construction covered with fabric. They are braced to the bottom fuselage longerons by Vee struts and are arranged to fold round the rear spar hinges.

The fuselage is of metal construction with fabric. The fuselage is in three sections consisting of the engine bearers, the cabin section and the rear section. The engine bearers are of welded square steel tube bolted direct to the front of the cabin section, the cabin section is of square steel tubes welded together with diagonal rigid tube bracing. The rear section is of welded round tubes rigidly braced throughout.

The tail-unit is of the normal D.H. type. In the 1931 model a larger rudder and fin are used and an improved type of free swivelling tail skid is fitted.

The undercarriage is of the divided type and the 1931 model incorporates both air and wheel brakes. The air

Les postes sont ouverts et en tandem, mais un coupé special peut être installé, permettant la conduite de l'appareil par les temps les plus froids sans vêtements spécial.

Des commandes doubles sont employées, mais celle d'avant peut être enlevée au besoin.

Plusieurs améliorations au confort intérieur seront réalisées dans le 1931 Model.

Un nouveau genre de pare-brise, en verre de sûreté, en trois sections, sera installé au post de pilotage, qui donnera une meilleure visibilité et plus de confort.

Un couvercle en contreplaqué, avec un pare-brise, tous les deux amovibles, your le poste avant, feront parti de l'équipement.

Un compas apériodique 6/18 Hughes Mk. IIIA et une montre de bord seront standard dans le 1931 Model.

Avec un poids normal total de 704 kg. le Gipsy-Moth, avec le moteur Gipsy I, a une vitesse maxima de 161 k.p.h., une vitesse croisière de 146 k.p.h., a une hauteur de 305 m., et une vitesse minima de 71 k.p.h.

Le même avion avec le moteur Gipsy II a une vitesse mavima de 172 k.p.h., une vitesse croisière de 146 k.p.h., à une hauteur de 305 m., et une vitesse minima de 71 k.p.h.

Le Gipsy-Moth peut être équipé aussi de deux longs flotteurs métalliques à redan, construction Short, et un grand nombre d'hydravions Gipsy-Moth sont en usage universel avec le plue grand succès.

### Le Puss-Moth.

En 1930 le société de Havilland presenta le Puss-Moth, pas comme successeur du Gipsy-Moth, mais pour répondre à la demande d'un avion léger plus luxueux. Ce besoin fut crée par le progrès remarquable de l'aviation amateur, stimulé par les Flying Clubs et le nombre d'écoles offrant l'entraînement à prix modéré sur avions légers économiques.

Durant son existence relativement courte, le Puss-Moth s'est fait une grande renommée. Il offre un confort associé jusqu'à maintenant avec une automobile saloon, et bien qu'il soit à conduite intérieure, la visibilité de la cabine, augmentée par un plafond transparent, de fenêtres profonds et un capotage du néz très étroit est meilleure de tous les appareils.

Le Puss-Moth a une vitesse maxima et croisière très, élevée, et son haut rendement général a été admirablement démontré par les raids retentissants de M. C. D. Barnard de Londres à Malte et retour avec arrêt unique à Malte, une distance de 4,500 km., (2,800 miles) en 27½ heures actuelles—et de Londres à Tanger et retour avec arrêt unique à Tanger, 3,862 km., (2,400 miles) en 23 heures actuelles.

Le Puss-Moth Modèle 1931 comporte plusieurs améliorations pour le maintenir au dernier point de développement auquel la société insiste toujours.

Le Puss-Moth est un monoplan à aile surélevée et haubannée, à deux ou trois places avec conduite interieure, muni d'un moteur inverse D.H. Gipsy III à 120 CV.

La voilure sont de construction en bois avec revêtement de toile. Elle est haubannée aux longerons inférieurs du fuselage par des mâts en V, et elle est repliable aux charnières des longerous de fuite.

Le fuselage est métallique et recouvert en toile. Il est en trois parties, le bâti-moteur, la cabine, et la partie arrière. Le bâti-moteur est en tubes carrés en acier soudes, boulonné directement au cloison de la cabine. Celle-ci est de la même construction avec un croisillement diagonal de tubes rigides. La partie arrière est en tubes ordinaires en acier soudés avec un croisillement pareil.

L'empennage est de la forme classique D.H. Dans le 1931 Model un plus grand gouvernail de direction et plan de dérive est employé ainsi qu'une nouvelle béquille orientable.

Le train d'atterrissage est à roues indépendentes, et le 1931 Model aura des freins aux roues et en l'air. Ces

**The 1931 D.H. Puss Moth monoplane (120 h.p. D.H. Gipsy III engine).**—*("Aeroplane" photograph.)*

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brakes are actually the streamline casings of the main undercarriage compression legs which are arranged to swivel through an angle of 90 degrees thus presenting a braking surface of some 2 sq. ft. to the wind. This is sufficient to reduce the top speed of the machine by 35 m.p.h. and reduces floating and steepens the gliding angle from 1 in 11 to 1 in 7.

The wheels of the 1931 model are of the Dunlop Air Wheel type with 19 in. by 7 in. tyres and these incorporate special Bendix wheel brakes. Tests with these wheels and brakes at Stag Lane showed some very conclusive results. Without the application of the brakes the machine ran a distance of 190 yards on landing. With application of the brakes this run was reduced to 96 yards and with fierce application of the brakes which was sufficient to lock the wheels the run was reduced still further to 66 yards. In these tests the machine weighed 1,750 lbs. and the load consisted of pilot, passenger and 30 gallons of fuel. There was no wind. Landing and taxying on muddy and rough surfaces are rendered far more comfortable and quite effortless by the wide section low pressure tyres. The wheel brakes allow for a wide degree of manœuvrability on the ground without external assistance.

The cabin normally accommodates pilot and one passenger seated in tandem but the back seat may be slid to one side to permit the erection of a folding seat for a second passenger. Dual control may be fitted if desired.

The visibility from the cabin is practically unrestricted. The forward view through the sloping windscreens is better than that obtained in any automobile. This is made possible by the installation of an inverted engine. Openable side windows are fitted along the sides of the cabin and a large transparent panel in the roof gives a good view above the wings and aft over the tail. To assist in the view above the wings, the wing roots are tapered and the sides of the roof panel have sloping windows so that it is only necessary to bank the machine slightly to be able to eliminate the only blind spot in the all round vision.

There is a very large door on each side of the cabin and a new and improved emergency exit in the roof has been fitted which may be opened instantly from either inside or outside the cabin. Other 1931 refinements in the cabin include improved seats to give greater comfort, a rudder-bar compensator which will enable the machine to be flown "feet-off," a step on the exhaust pipe to facilitate entry and exit, an opening panel in the port side windscreen to give the pilot improved visibility in unfavourable weather, and improved catches to all the windows. An additional air speed indicator of the D.H. strut-fitting type will also be provided as a standard fitment.

As already mentioned the engine is a D.H. Gipsy III. It is mounted on rubber to eliminate vibration. The main fuel tanks are mounted in the wings.

A special fire extinguisher apparatus of the Essex "Featherspray" type is installed, which by a simple operation of the foot sprays the carburettor or engine bay with extinguishing liquid. The entire apparatus is instantly detachable from its fixing for dealing with fire at any other part of the structure.

The Puss-Moth loaded to a maximum weight of 1,900 lbs. has a top speed of 127 m.p.h., a cruising speed of from 100 to 110 m.p.h., and a stalling speed of 44 m.p.h. It climbs to 5,000 ft. in 9 minutes, to 10,000 ft. in 22½ minutes, and it has an absolute ceiling of 17,500 ft.

The Puss-Moth can also be equipped as a seaplane by the fitting of twin Short metal floats.

Concurrently with the development of the Gipsy-Moth and the Puss-Moth the De Havilland company has built up a World-wide service organisation.

Associated companies have been established in Canada, Australia, India and South Africa. Licences to build the Gipsy-Moth have been sold to the Morane-Saulnier company in France, the Moth Aircraft Corporation in the U.S.A. and to the Government Aircraft Factory in Finland. There are also over sixty accredited Moth agents in different parts of the World.

All these companies, licencees and agents are in a position to give immediate service to Moth owners in almost every civilised part of the World

Other important products of the De Havilland company include the Hawk-Moth, a four/six-seat cabin monoplane with the 240 h.p. Armstrong Siddeley Lynx engine, and the Hercules fourteen passenger biplane with three 450 h.p. Bristol Jupiter engines. This latter type is on use on the Cairo-Karachi section of the England-India route operated by Imperial Airways and also on the Perth-Adelaide route across Australia operated by West Australian Airways.

In the military field the company has produced the D.H. 77, a single-seat Interceptor fighter monoplane with the new 300 h.p. Napier Rapier engine. This machine has a top speed of 203 m.p.h. at 20,000 ft. and is therefore one of the fastest single-seat fighters in the World.

derniers sont actuellement les revetements profilés des jambes principales de compression du train d'atterrissage qui sont disposés de facon de pivoter par up arc de 90 deg., offrant ainsi une surface freinante au vent d'environ 18 dcm.2. Ceci est assez effectif pour réduire la vitesse maxima de l'avion de 56 k.p.h., (35 m.p.h.) réduit le flottement et accuse l'angle de piané de 1 par 11 à 1 par 7.

Les roues du 1931 Model sont des Dunlop avec pneus de 483 mm. by 178 mm., incorporant des freins Bendix spéciaux. Des essais faits avec ces roues et ces freins ont donné des résultats intéressants. Sans l'application des freins l'appareil a roulé 172 m., à l'atterrissage. Avec les freins, seulement 87 m., et avec une application brutale des freins, suffisante à bloquer les roues, le roulement a été réduit jusqu'à 60 m. Pour ces essais, l'avion pesait 781 kg., et comportait le pilote et le passager et 135 litres d'essence, et le vent était nul. L'atterissage et le roulement sont beaucoup facilités par les pneus à basse tension et à large face. Les freins permettent une grande maniabilité sur le sol sans aide externe.

La cabine loge en général le pilote et un passager, mais le siège arrière peut être glissé de côté pour permettre l'érection d'un siège rabattable pour un deuxième passager. Des doubles commandes sont installeés sur demande.

Les vues de la cabine sont presque sans restriction. Celles d'avant par les pare-brise inclinés sont meilleures que dans aucune automobile. Cette grande visibilité est rendue par l'installation d'un moteur inversé. Des fenêtres ouvrables de côté et un grand panneau transparent au plafond permet une vue étendue au dessus des ailes, et en arrière au dessus de la queue. Pour augmenter la visibilité en haut, les encastrements des ailes supérieures sont échancrés et les côtés du panneau sont inclinés de sorte qu'il est seulement nécessaire de virer légèrement l'appareil pour éliminer le seul point faible d'une visibilité qui fait tout le cercle.

Il y a une grande porte à chaque côté de la cabine, et une sortie d'urgence améliorée dans le plafond qui peut être ouverte instantanément de l'intérieur de la cabine ou de dehors. D'autres perfectionnements comportent des sièges d'un plus grand confort, un compensateur pour la barre du gouvernail qui permet au pilote de voler sans la toucher, un pas sur le tuyau d'échappement qui facilite l'entrée et la sortie, un panneau rabattable dans le pare-brise à gauche qui améliore les vues du pilote en mauvais temps, et des cliquets pratiques à toutes les fenêtres. Un indicateur de vitesse supplémentaire sera standard, installé au mât.

Le moteur est un Gipsy III, monté sur des blocs de caoutchouc pour éliminer les vibrations. Les réservoirs principaux d'essence sont logés dans les ailes.

Un extincteur d'incendie special modèle Essex "Featherspray" est installé, qui par un simple mouvement du pied arrose le carburateur et la travée du moteur avec le liquide extincteur. L'appareil entier est instamment détachable pour s'occuper d'un sinistre ailleurs.

Le Puss-Moth chargé au poids maximum de 862 kg., a une vitesse maxima de 203 k.p.h., une vitesse croisiére de 161-168 k.p.h., et une vitesse minima de 67.6 k.p.h. Il monte à 1,525 m., en 9 minutes, à 3,050 m., en 22½ minutes, et son plafond absolu est de 5,334 m.

Le Puss-Moth peut être transformé aussi en hydravion par l'installation de deux flotteurs Short, métalliques.

En même temps que la société de Havilland a évolué le Gipsy-Moth et le Puss-Moth, elle a établi une organisation universalle de service. Des sociétés associées ont été établies au Canada, en Australie, aux Indes et dans l'Afrique du Sud. Des permis de construction ont été accordés à la société Morane-Saulnier en France, à la Moth Aircraft Corporation aux Etats Unis, et à la Government Aircraft Factory à la Finlande. Il y a aussi plus de soixante représentants accrédités du Moth différentes parties du monde. Toutes ces sociétés licenciés et représentants sont en état d'offrir un service immédiat aux propriétaires de Moths dans presque toutes la parties civilisées du monde.

La série d'avions de Havilland comprend aussi le Hawk Moth, un monoplan, 4—6 places, à conduite intérieure, avec un moteur Armstrong Siddeley Lynx de 240 CV, et le Hercules biplan transporteur à 14 places, avec trois moteurs Bristol Jupiter de 450 CV. Ce dernier modèle est employé sur la partie de la ligne de Londres aux Indes entre le Caire et Karachi, operée par les Imperial Airways, et aussi sur la route de Perth à Adelaide à travers l'Australie, opérée par les West Australian Airways.

Du côté militaire, la sociéte a construit le D.H. 77 un monoplan monoplace de chasse "Jockey" avec le nouveau Napier Rapier de 300 c.v. Cet avion a une vitesse maxima de 326 k.p.h., à 6,100 m., et il est par conséquent, un des monoplaces de chasse le plus rapide au monde.

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### The D.H. Gipsy Engines.

The De Havilland Aircraft Co. Ltd. entered the Aero-engine Industry in 1927 when they produced the Gipsy engine as a power-plant suitable for light aeroplanes.

The first engine was turned out in June 1927 and this engine in the D.H. Tiger-Moth, put up a World's speed record for light aircraft of 186 m.p.h. which record still stands. After a year's experimental work both on the test bed and in the air the Gipsy engine was submitted to the Air Ministry Type Test which it passed satisfactorily. The Gipsy was the first engine to pass this test while running on ordinary motor car spirit. The 100 h.p. Gipsy engine was thereafter put into production in a new factory which was specially built for the purpose and it was naturally standardised for the D.H. Moth. The immediate success of the engine in this machine resulted in a World-wide demand for this very efficient power-unit and it is now installed in several other types of British and foreign light aeroplanes.

Apart from the large number of World's Records and famous long-distance flights made by this engine its most outstanding achievement was the famous 600 hrs. Reliability Tour made with a perfectly standard and officially-sealed Gipsy engine in 1928-29.

This test occupied nine months and during this time the engine was flown in a Moth for 600 hrs. without overhaul, repair or replacements. The machine covered a total mileage of 51,000 miles without the slightest trouble and the average cost in petrol and oil for the whole test was 1d. per mile flown.

In 1930 the De Havilland Company produced two new engines known as the Gipsy II and Gipsy III which give a slightly increased power as compared with the Gipsy I. Both the Gipsy II and Gipsy III are essentially the same and give an output of 120 h.p. but the Gipsy III is an inverted engine.

This inverted engine is the standard power-unit of the D.H. Puss Moth which machine since its introduction has put up some astounding performances. It is also standardised in the Desoutter Sports Coupe monoplane and it is now being installed in several other types of light aircraft.

There is no doubt that the inverted engine has revolutionised the design of light cabin aircraft. Its low frontal area, high thrust-line, and the absence of obstruction above the crankcase make it possible to design a cabin machine from which the forward and downward view are better than those obtained from any automobile.

The 120 h.p. Gipsy II is an alternative power-unit for the Gipsy Moth.

The slightly enhanced power of the Gipsy II is very useful where an aeroplane is called upon to give slightly increased take-off and climb such as is required for operation from small aerodromes or from aerodromes of high altitude. The Gipsy II is also an ideal power-plant for the light seaplane.

This engine was used in the machine in which Sqn. Ldr. Kingsford Smith flew from England to Australia in the record time of 10½ days, which flight provides proof, if such is necessary, of the reliability and efficiency of the Gipsy engine.

The specifications of the three Gipsy engines follow:

### Les moteurs D.H. Gipsy.

La société de Havilland s'est lancée dans l'industrie des constructions de moteurs aéronautiques en 1927, par la production du moteur Gipsy comme groupe propulseur approprié aux aéroplanes légers.

Le premier moteur, sorti des ateliers de la Compagnie en juin 1927, monté sur Tiger-Moth D.H., ne tarda pas à s'approprier le record mondial de la vitesse pour aéroplanes légers de 300 kilomètres à l'heure, qui n'a pas été battu depuis. Après un an d'essais, tant sur le band d'essai que dans l'air, le moteur Gipsy a été soumis au Ministère de l'Aéronautique, et passa victorieusement les essais officiels. Il est à noter que le Gipsy a été le premier à passer ces épreuves en utilisant d'automobile. A partir de ce moment a commencé la fabrication du moteur Gipsy de 100 h.p. dans une usine construite spécialement à cet usage; ce moteur a, naturellement, été agencé comme moteur de série pour le Moth D.H. Son succès immédiat créa une demande universelle et il monté maintenant sur un grand nombre d'avions légers anglais et étrangers.

Outre le grand nombre de records établis par ce moteur au cours de grands raids, l'exploit le plus remarquable qu'il a mis à son crédit a été le célèbre vol de sécurité de fonctionnement de 600 heures, effectué en 1928-29 avec un de ces moteurs de type de série pur et simple, mis sous sceau officiel.

Au cours de cette épreuve, qui dura neuf mois, ce moteur Gipsy a fonctionné à bord d'un Moth, pendant 600 heures, sans aucune revision, réparation, ni remplacement. L'appareil a couvert une distance de 82,000 kilomèthes sans faiblir au moindre degré, et le coût moyen de consommation d'essence et d'huile, du début à la fin de l'épreuve, a été de l'ordre de trente centimes par kilomètre.

En 1930 la Compagnie De Havilland a mis sur le marché deux nouveaux modèles de moteur dénommés Gipsy II et Gipsy III dont la puissance est légèrement plus grande que celle du Gipsy I. Ces deux nouveaux modèles sont identiques dans leurs grands lignes, et développent 120 h.p. mais le Gipsy III est inversé. Celui-ci est installé normalement sur l'avion D.H. Puss-Moth, qui, depuis ses débuts, a mis à son actif des performances réellement saisissantes, ainsi que sur le monoplan de type coupé de sport Desoutter, et il est actuellement en voie de montage sur divers autres types de machines légères.

Il est certain que le moteur inversé a révolutionné le dessin des avions légers à cabine. Ses qualités de surface frontale réduite, de ligne de poussée élevée, et de profil dorsal net, ont permis la réalisation d'un appareil aves des meilleures vues en avant et en bas que celles d'une automobile.

Le moteur Gipsy II de 120 h.p. est destiné à prendre, en cas de besoin, la place des types de moteurs précédents à bord de la machine Gipsy-Moth.

Le surcroît de puissance qui lui a été conféré rend de très précieux services, dans les cas où il importe d'assurer à l'avion une vitesse de départ et un taux de grimpée quelque peu plus élevés, tels que celui de l'usage d'aérodromes à enceinte plutôt restreinte, ou situés à une altitude plutôt élevée. Il convient d'ajouter, à ces considérations militant dans certains cas, pour l'usage du Gipsy II, celle conférant, à ce moteur, des qualitées tout à fait exceptionnelles pour la propulsion d'hydroplans légers.

Ce moteur était monté sur la machine avec laquelle le Sq. Ldr. Kingsford Smith a fait le voyage d'Angleterre en Australie, établissant le record de 10 jours et demi pour la randonnée. Cette dernière a encore fouri, pour autant qu'elle était encore à faire, des superbes qualités de sécurité de fonctionnement, d'endurance, et de haut rendement du moteur Gipsy.

Nous donnons, ci-dessous, les spécifications abrégées des trois types de moteurs Gipsy:—

| | Gipsy I. | Gipsy II. | Gipsy III. | |
|---|---|---|---|---|
| Bore and Stroke ... ... | 114 × 128 | 114 × 140 | 114 × 140 | Alesage et course |
| Compression ratio . ... | 5 : 1 | 5.2 : 1 | 5.2 : 1 | Rapport de compression |
| Power output (at max. r.p.m.) | 98.5 at 2,100 | 120.5 at 2,200 | 122 at 2,200 | Puissance au nombre de t.p.m. maxima |
| Weight (dry including airscrew hub) ... ... ... | 285 lbs. (129.4 kgs.) | 295 lbs. (144 kgs.) (includes oil sump and airscrew spinner) | 285 lbs. (129.4 kgs.) (Dry sump. Includes airscrew spinner) | Poids (sec, moyeu d'helice compris) |
| Weight per h.p. (max.) ... | 2.85 lbs. (1.3 kgs.) | 2.44 lbs. (1.1 kgs.) | 2.4 lbs. (1.08 kgs.) | Poids au CV. |
| Petrol consumption (at max. h.p. and r.p.m.) ... ... | 0.6 pts. per h.p./hr. (0.36 litres c.v./heure) | 0.57 pts. per h.p./hr. (0.26 litres c.v./heure) | 0.57 pts. per h.p./hr. (0.26 litres c.v./heure) | Consommation d'essence à puissance et nombre de t.p.m. maxima |
| Oil consumption (at max. h.p. and r.p.m.) ... ... ... | 0.5-0.75 pts. per h.p. hr. (0.3-0.4 litres c.v./heure) | 0.75-1.0 pts per h.p./hr (0.4-0.56 litres c.v/heure) | 0.75-1.0 pts. per h.p. hr (0.4-0.56 litres c.v./heure) | Consommation d'huile à puissance et nombre de t.p.m. maxima |

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# THE DESOUTTER AIRCRAFT CO. LTD.

**HEAD OFFICE AND WORKS:—CROYDON AERODROME, LONDON, S.W.**

**The Desoutter Mk II Sports Coupé (D.H. Gipsy II engine).**—(*"Aeroplane" photograph.*)

The latest product of the Desoutter Aircraft Co., Ltd. is the Desoutter Mk. II Sports Coupe monoplane. This machine is the development of the original Desoutter monoplane which at the time of its introduction at the end of 1929 was the only three seat cabin monoplane in Great Britain.

The Desoutter Mk. II monoplane is fitted with the 120 h.p. D.H. Gipsy III inverted engine, and this engine, apart from greatly improving the general appearance of the machine, gives a higher top speed without interfering with the slow landing and non-stalling qualities of the earlier model. The inverted engine allows for a perfectly clean and uninterrupted top line to the cowling and a narrower nose, both of which features give a better vision forward from the cabin.

The cabin has accommodation for three, with the pilot seated centrally in front and the two passengers at the back of the cabin side by side on comfortably upholstered seats.

With the higher thrust line obtained with the inverted engine it has been possible to lower the undercarriage so that the cabin is nearer the ground. With two doors, one on either side, direct access is provided to both the passenger seats with the convenience equal to that of the modern saloon automobile.

The vision from the cabin is excellent. In front of the pilot windscreens slope down and inwards from the wing to the engine cowling. The windows alongside the pilot extend below the waistline of the machine and owing to the narrow engine cowling forward vision through these windows is very good. Openable windows are provided alongside the passenger seats and above them there is a combined roof light and emergency exit.

Under the passenger's seats there is room for two suitcases which are supplied as part of the equipment of the machine, and above and behind the seats there is an open luggage compartment.

The pilot's seat has a 2-inch fore-and-aft adjustment which, in conjunction with the adjustable pedals, allows for the accommodation of pilots of every variation of height and length of leg.

A very complete set of instruments is supplied as standard. These include an air speed indicator, altimeter, engine revolution indicator, cross-level, petrol gauge, oil pressure gauge and compass.

The maximum permissible loaded weight of the machine is 1,900 lbs. (863 kgs.) but it has been awarded an Aerobatic Certificate of Airworthiness for a loaded weight of 1,550 lbs. (704 kgs.).

The Desoutter Mk. II Sports Coupe has a maximum speed of 125 m.p.h. and has a landing speed of from 45 to 50 m.p.h. With normal fuel load it has a range of 5 hours which is equivalent to 500 miles at a cruising speed of 100 m.p.h.

La dernière production de la société est le Desoutter Mk. II monoplan de sport à conduite intérieure. Cet appareil est dérivé du premier monoplan Desoutter, qui, lors de sa présentation à la fin de 1929, fut le seul monoplan limousine triplace en Angleterre.

Le Desoutter Mk. II est muni du moteur inversé D.H. Gipsy III 120 CV, qui tout en améliorant l'aspect général de l'appareil, lui permet une vitesse augmentée sans la perte des qualités d'atterrissage facile et de maniabilité aux vitesses faibles que possédaient son prédécesseur. Le moteur inversé a permis aussi un profilage dorsal très harmonieux et un raffinement sensible du nez. De ces faits, la visibilité en avant est plus grande.

La cabine prend trois personnes, le siège du pilote se trouvant centralisé en avant, et ceux des voyageurs en arrière, côte à côte, confortablement aménagés.

La ligne de poussée plus haute obtenu par l'installation du moteur inversé permet le rabaissement du train d'atterrissage et un accès plus aisé à la cabine. Celle-ci a une porte de chaque côté, offrant ainsi aux passagers une facilité d'entrée aussi grande que celle d'une automobile.

Le dégagement des vues est excellent. En face du pilote des pare-brise sont disposés entre l'aile et le capotage. Les fenêtres en avant se prolongent, et par suite de la forme du nez permettent une grande visibilité. Celles des passages sont ajustables, et un panneau entoilé au plafond sert d'éclairage et de moyen d'évacuation.

En dessous des deux sièges, place est prévue pour deux valises qui font partie de l'équipement de l'appareil, et il y a en arrière des sièges une cale à bagages ouverte. Le siège du pilote peut avancer ou reculer de 5 cm., et avec les pédales réglables assurent le confort du pilote, quel que soit sa grandeure.

Une série complète d'instruments de bord est fournie avec l'appareil: indicateur de vitesse, alimètre, compte-tours, clinomètre, jaugeur d'essence, indicateur de pression d'huile et compas.

Le poids maximum chargé est de 863 kg., (1,900 lb.) mais l'appareil a reçu un certificat de navigabilité pour vols d'acrobatie avec un poids chargé de 704 kg., (1,550 lb.).

Le Desoutter Mk. II a une vitesse maxima de 200 k.p.h. et une vitesse d'atterrissage de 72-80 k.p.h.
Avec plein chargement d'essence, il a une autonomie de 5 heures, qui représente 800 km., à une vitesse croisière de 160 k.p.h.

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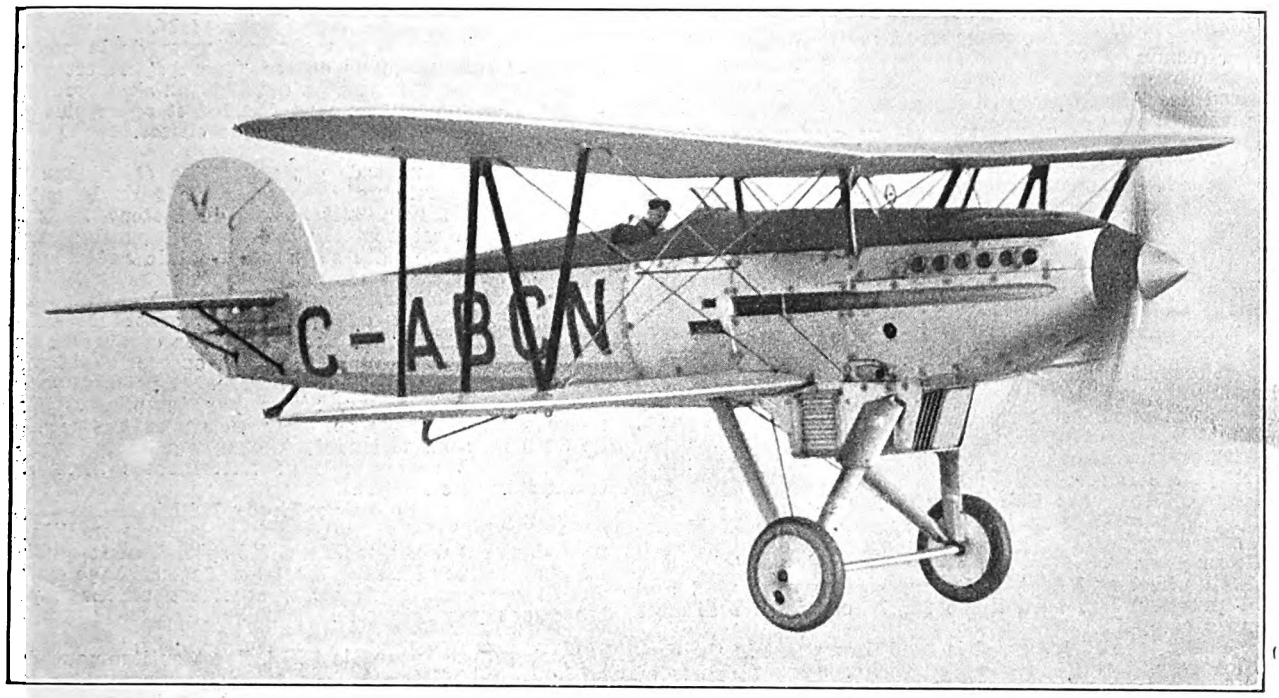
# THE FAIREY AVIATION CO., LTD.

**HEAD OFFICE AND WORKS: HAYES, MIDDLESEX.**




**The Fairey Firefly II M single-seat fighter biplane (Rolls-Royce "F" engine).** —(*"Aeroplane" photograph.*)

The Fairey Aviation Co., Ltd., are well known as the producers of a wide range of successful military aircraft and many different types have been supplied to the British and to several foreign governments since 1918.

The company has specialised in the design and construction of high performance single-engined military aircraft and in this respect it has achieved considerable success.

The most notable of its recent products are the Fairey III F two or three-seat General Purposes landplane or seaplane, the Fairey Firefly II M single-seat Interceptor fighter, the Fairey Firefly III M single-seat Ship fighter, the Fairey Fleetwing two-seat Fighter Reconnaissance Shipplane and the Fairey Fox two-seat day bomber.

### The Fairey III F.

The Fairey III F is a single-engined biplane which has been designed to fulfil a variety of military uses. It is at present being made in two versions, one as a two-seat General Purposes aircraft and the other as a three-seat Naval Reconnaissance aircraft and either of these types may be converted from landplane to seaplane.

The standard III F is fitted with the 570 h.p. Napier Lion, Series XI engine, but any engine of from 400-600 h.p. may be fitted with very little modification. Large numbers of this type of machine have been supplied to the Royal Air Force, the Air Forces of the Dominions, as well as to the Irish Free State Air Force, the Argentine Naval Air Service, the Chilean Naval Air Service, the Greek Naval Air Service, etc.

In order to preserve the clean lines and therefore the high performance of the type all the necessary equipment is carried within the fuselage and in spite of the comprehensive equipment carried the cockpits are extremely roomy. In the pilot's cockpit every necessary instrument is grouped on a lighted dashboard, and all other accessories are carefully placed so as to be within easy reach of the pilot. Immediately behind the pilot's cockpit is the gunner's or observer's cockpit. In the General Purpose type this or observer's cockpit.

This back cockpit may be equipped with a Fairey patent gun-mounting which gives an increased field of fire and allows the gun when not in use to be stowed in the fairing behind the cockpit thus giving additional room in the cockpit. Provision is made for the carriage of a spare wheel and ration boxes, drinking water tank and other special equipment may also be carried. Both types of IIIF have been arranged so that a single stretcher case may be carried in an emergency and a standard Army stretcher may be carried in the machine. Other equipment carried includes camera, wireless equipment, oxygen apparatus, parachutes, etc.

The armament consists of a fixed Vickers machine gun firing forward through the airscrew and a Lewis gun

La société Fairey est le constructeur bien connu d'une grande série d'avions militaires et a fourni beaucoup de modèles différents à la Royal Air Force et aux Aéronautiques étrangères depuis 1918.

La société s'est spécialisée dans la construction d'appareils militaires mono-moteurs à haut rendement, et sous ce rapport elle a achevé un succès considérable.

Les plus importantes de ses dernières constructions sont le Fairey III F, avion ou hydravion de servitude à deux ou trois places, le Fairey Firefly II M. avion de chasse "jockey" monoplace, le Fairey Firefly III M, avion de chasse monoplace pour vaisseau, le Fairey Fleetwing avion biplace de combat-reconnaissance pour vaisseau, et le Fairey Fox, avion de bombardment de jour biplace.

### Le Fairey III F.

Le Fairey III F est un biplan mono-moteur établi à remplir plusieurs fonctions militaires. Actuellement il est fait en deux modèles, l'un comme appareil de servitude à deux places, et l'autre comme avion marin de reconnaissance à trois places, et tous les deux peuvent être transformés en hydravion.

Le Fairey III F normal est équipé d'un moteur Napier Lion XI, mais tout moteur de 400-600 CV peut être installé avec très peu de modification. Un grand nombre de ces appareils a été livré à la Royal Air Force et aux Aviations de l'Empire, ainsi qu'à la Irish Free State Air Force et aux Aéronautiques Navales Argentine, Chilienne, et Grecque, etc.

Afin de conserver les lignes nettes et par conséquent le haut rendement de l'avion, tout l'équipement est logé dans le fuselage, et bien qu'il soit très complet les postes sont spacieux. Au poste du pilote tous les instruments sont groupés sur une planche éclairée, et tous les autres accessoires sont à sa portée. Immédiatement à l'arrière du poste du pilote se trouve celui de l'observateur.

Ce poste arrière peut être équipé d'une tourelle (brevet Fairev) qui donne un secteur de tir plus dégagé, et qui permet à la mitrailleuse d'être arrimée dans le carénage derrière le poste quand elle n'est pas en usage, et donne plus de place à l'équipage. L'aménagement comporte aussi une roue de réserve, rations, réservoir d'eau potable, etc. Les deux modèles du Fairey III F peuvent accommoder un blessé dans un brancard en cas d'urgence, et un brancard militaire standard peut faire part de l'équipement. Ce dernier comporte encore un appareil photographique, dispositif de T.S.F., et d'oxygène, parachutes, etc.

L'armament consisté d'une mitrailleuse Vickers fixe tirant en avant à travers l'helice, et une mitrailleuse Lewis monté

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mounted over the back cockpit either on a patent Fairey gun-mounting or the normal Scarff ring mounting. Bombs are carried under the wings and a prone bombing position provided with all the necessary instruments is located in the floor of the back cockpit.

**The Fairey Firefly II M.**

The most outstanding of the recent products of the Fairey company is the Firefly single-seat Interceptor fighter. It is claimed that in official tests this machine has proved itself to be faster in speed and climb and to have a greater degree of manœuvrability than that of any other fighter aircraft.

The high performance of this machine has been obtained by the reduction of the frontal area to a minimum, a feature that has been made possible by the fitting of the Rolls-Royce F.XII.S. engine which is notable for its remarkably small cross-section.

The fighting view from the cockpit is excellent. The pilot's eyes are on a line with the chord line of the centre-section and an adjustable seat enables him to view any area temporarily obstructed by the centre-section or main planes.

The cockpit is adequately ventilated and heated and both heating and ventilation are controlled by the pilot. They enable the pilot to remain comfortably warm at 20,000 ft., without the necessity of electrically heated clothing.

The armament consists of two fixed Vickers guns firing through the airscrew.

**The Fairey Firefly III M.**

The Firefly III M is very similar to the type II M previously described but it has been specially designed as a ship's fighter.

Both wheel and float under carriage may be used and full provision has been made for launching the aircraft from a catapult.

Like the type II M. metal is used throughout in the construction with the exception of the covering which is of fabric. The fuselage is constructed of steel tubes in three sections. The wings incorporate high tensile steel spars and duralumin ribs. Special camber-aileron control is used which gives a low landing speed. Independently operated wheel brakes are fitted as standard.

The armament consists of two fixed Vickers guns firing through the airscrew and the general equipment of the machine includes a complete set of flying instruments ,a full two-way wireless apparatus, oxygen equipment, &c.

The engine fitted is the Rolls-Royce F.X.II.S. and this machine like the type II M has a very high all-round performance.

**The Fairey Fleetwing.**

The Fleetwing is a two-seat fighter-reconnaissance biplane for naval use and is fitted with the Rolls-Royce F. XII. MS engine. Both wheel and float undercarriages may be fitted and full provision is made for launching from a catapult. The wings are made to fold.

The construction of the machine is similar to that of the Firefly type.

The armament consists of one fixed Vickers gun firing through the airscrew and a special mounting of the Fairey patent high speed type over the back cockpit. Provision is made for the carrying of four 20 lb. bombs and included in the equipment of the machine are full wireless equipment, camera, electrical gear, etc.

**The Fairey Fox.**

The Fox is a high performance two-seat day bomber which may be fitted with either Fairey Felix (Curtiss D-12) or the Rolls-Royce F XII engine. This machine has been in use in the Royal Air Force for some years where, under service conditions, it has acquitted itself well.

In spite of its comparatively light weight the small cross section of the fuselage and general overall dimensions, all features which contribute to the high performance of the type ,the Fox carries a very comprehensive load and equipment. This includes an armament of two guns, one fixed and firing forward through the airscrew and one on a Fairey high-speed gun mounting over the rear cockpit, camera, full wireless equipment, racks to carry two 230 lb. four 112 lb., or eight 20 lb. bombs, all necessary bomb sights, etc.

The Fairey Aviation Co., Ltd. have a very fully equipped research department and although it is not permissible to refer to the latest developments mention can be made of the steam-cooling research done by the company. This form of engine-cooling has now reached a satisfactory stage of development. This form of cooling eliminates the normal type of radiator but makes use of condenser units which may be incorporated in the leading-edge of the wings, struts, etc.

The company have also developed the Fairey metal airscrew which is now in widespread use on aircraft of all types and sizes. Fairey metal airscrews were used on the winning aircraft in the last two Schneider Trophy contests and also on the machine which now holds the World's Speed Record.

au poste arrière sur la tourelle Fairey brévetée ou la Scarff. Les bombes sont portées sous les ailes, et une position étendue est aménagée pour le bombardier dans le poste arriére avec tous les instruments utiles.

**Le Fairey Firefly II M.**

Le plus frappant des modèles récents de la société est le Firefly monoplace de chasse "jockey." Il est prétendu qu'au cours d'essais officiels, cet appareil s'est prouvé d'une vitesse et d'une montée plus rapides, et d'une plus grande maniabilité que tout autre avion de chasse.

Le haut rendement de cet appareil a été obtenu par la réduction au minimum de la superficie frontale, qui a été rendu possible par l'installation du moteur Rolls Royce F. XI. S. qui est remarquable par son profil transversal étroit. Bien que cette superficie frontale soit très réduite le poste de pilotage est assez spacieux pour les besoins, et une accessibilité rapide à tous points à été spécialement prévue. Les vues du poste avant sont très dégagées. Les yeux du pilote sont au niveau de la corde de la partie centrale de l'aile, et la vue est encore améliorée par l'aménagement d'un siège réglable. Le chauffage et la ventilation sont prévus, réglés par le pilote. Ils permettent au pilote de se tenir au chaud à une hauteur de 6,000 m. sans vêtements à chauffage électrique.

L'armement comporte deux mitrailleuses fixes Vickers tirant à travers l'hélice.

**Le Fairey Firefly III M.**

Le Firefly III M resemble beaucoup au modèle II M préalablement décrit, mais il a été spécialement étudié pour un chasseur de vaisseau. Le train d'atterrissage est adaptable à roues ou à flotteurs, et il est aménagé pour le lancement par catapulte.

Ainsi qu'avec le modèle II M, il est entièrement de construction métallique à l'exception du revêtement qui est en toile. Le fuselage est construit de tubes en acier en trois parties. Les ailes comportent des longerons en acier à haute résistance et des nervures en duralumin. Un dispositif spécial pour cambrer les ailerons permet une vitesse d'atterrissage très réduit, et des roues à freins indépendants sont fournies standard.

L'armement comporte deux mitrailleuses fixes Vickers tirant à travers l'hélice, et l'appareil est équipé d'une série complète d'instruments de bord, d'un appareil de T. S. F., et d'oxygène, etc.

Le moteur est un Rolls Royce F. XII S., et cet avion, comme le II M., à un très haut rendement.

**Le Fairey Fleetwing.**

Le Fleetwing est un avion biplace de chasse et de reconnaissance pour la marine, muni d'un moteur Rolls Royce F. XII MS. Il est adaptable à roues ou à flotteurs, et peut être lancé par catapulte. Les ailes sont repliables.

La construction de l'avion est pareil à celle du type Firefly.

Il y a une mitrailleuse fixe Vickers tirant à travers l'hélice, et une tourelle brévetée Fairey au poste arrière Le transport de quatre bombes à 9 kg. (20 lb.) est prévu, et l'équipement comporte des appareils photographique et de T.S.F., dispositif électrique, etc.

**Le Fairey Fox.**

Le Fox est un biplan biplace de bombardement de jour à haut rendement, équipé d'un moteur Fairey Felix (Curtis D-12) ou d'un Rolls Royce F. XII. Cet appareil a été employé par la Royal Air Force depuis plusieurs années, et pendant ce temps, sous des conditions sévères, il a toujours donné pleine satisfaction.

Bien que le poids du Fox ne soit pas très élevé, le profil transversal réduit du fuselage, et les dimensions générales de l'appareil qui contribuent au haut rendement de ce type, il comporte un équipment très complet. Ceci comprend un armement de deux mitrailleuses, l'une fixe et tirant à travers l'hélice, et l'autre sur la tourelle Fairey au poste arrière, un appareil photographique, la T. S. F., des supporte-bombes pour 2 bombes à 109 kg., ou 4 à 50 kg., ou 8 à 9 kg., et les instruments de visée, etc.

La société Fairey a des bureaux d'études et ateliers d'essais très bien équipés, et bien qu'il ne soit pas permis de décrire les dernières recherches, il est possible de citer le système de refroidissement à vapeur, qui est arrivé maintenant à un point satisfaisant de développement. Ce système éliminera le radiateur ordinaire, mais aura recours à des éléments condenseurs incorporés dans le bord d'attaque des ailes, des mâts, etc.

La société a évolué aussi l'hélice métallique Fairey, qui est maintenant installé sur un grand nombre d'avions de classes différentes. Les deux avions gagnants des deux derniers concours pour la Coupe Schneider étaient équipés d'hélices métalliques Fairey, ainsi que l'appareil qui détient actuellement le Record du Monde de Vitesse.

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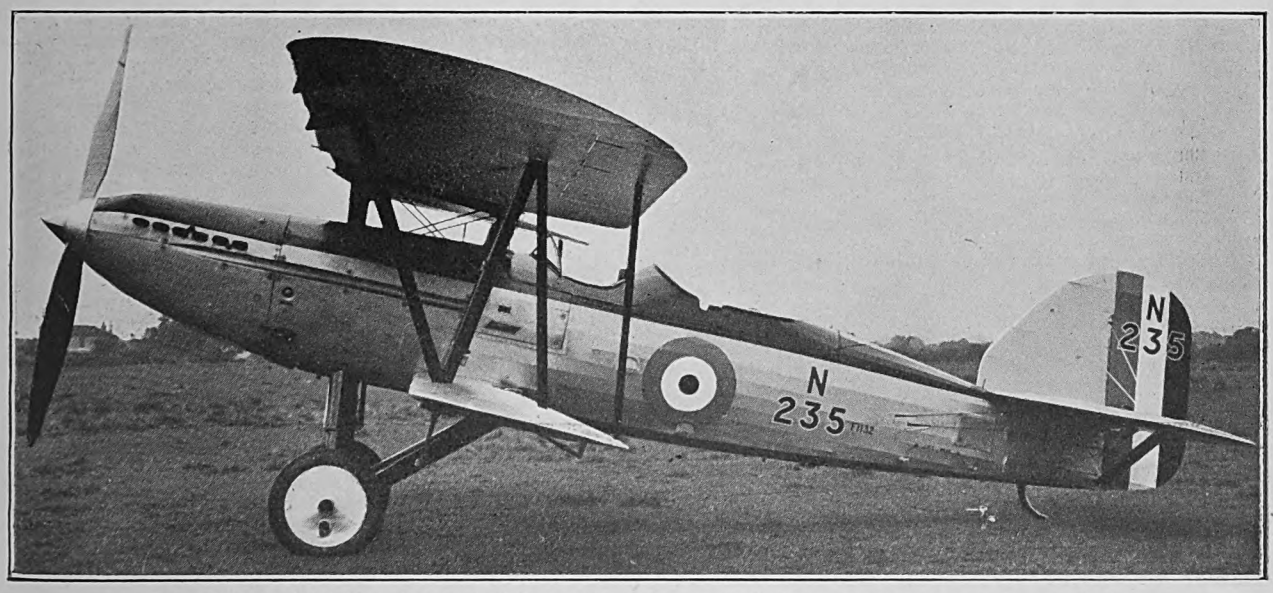
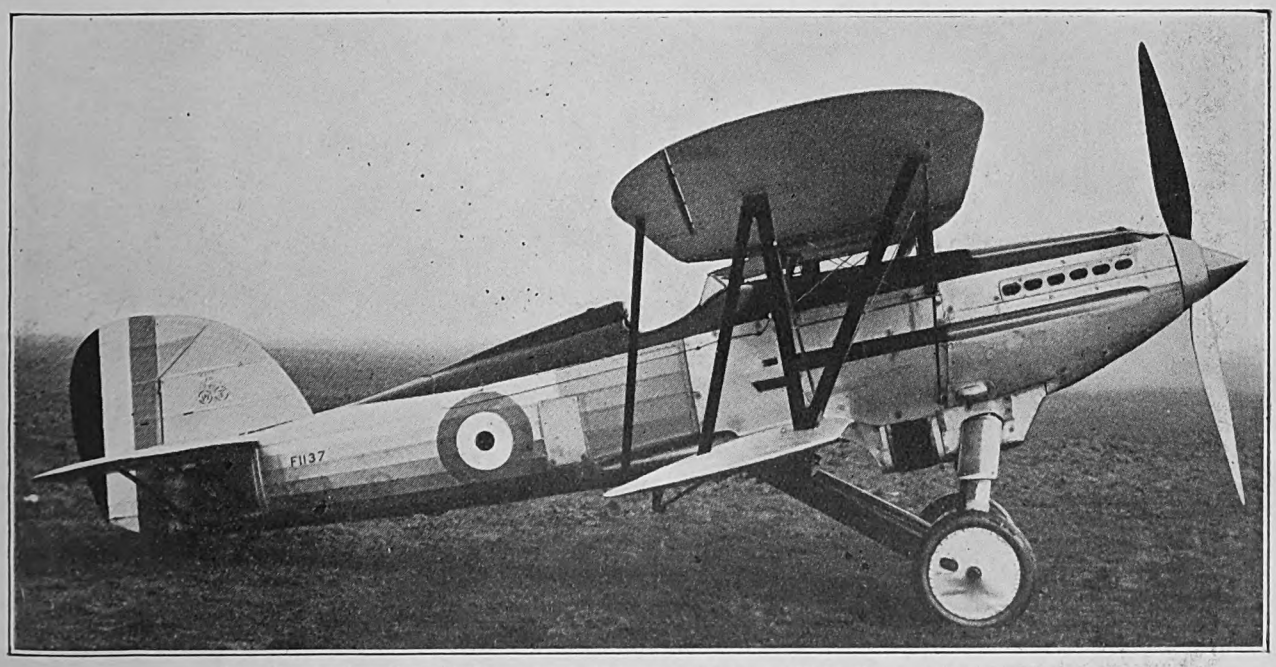
The Fairey III F two-seat General Purposes biplane (570 h.p. Napier Lion engine).




The Fairey Fleetwing two-seat fighter-reconnaissance biplane (Rolls-Royce "F" engine).




The Fairey Firefly III M single-seat fighter biplane (Rolls-Royce "F" engine).

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# THE GLOSTER AIRCRAFT CO., LTD.

## HEAD OFFICE AND WORKS: HUCCLECOTE, GLOUCESTERSHIRE.

**The Gloster A.S.31 Twin-engined General Purpose Biplane.**

The Gloster A.S.31 is a twin-engined high-performance civil biplane which is suitable for a number of different uses. This machine has already been used as an Air Survey machine with every success by the Aircraft Operating Co. Ltd., and has made an extensive survey in South Africa. The machine was flown from England to South Africa at an average speed of 108 m.p.h.

This machine can be supplied as follows:

Air Survey Type.
Charter Machine.
Ambulance Machine.
Light Day Bomber.
Coastal Fishing Patrol Type.
Freight or Mail Carrier.

This type of machine can be given a British Certificate of Airworthiness to fly at a gross weight of 9,200 lbs., and as the empty weight is 6,250 lbs, the available fuel, crew and pay load is 2,950 lbs. This load can be proportioned as desired according to the specific requirements and distance required to be flown.

The minimum fuel consumption when cruising at 115 m.p.h. at 5,000 ft. is 275 lbs. per hour of petrol and 40 lbs. of oil per hour.

Allowing 300 lbs. for pilot and equipment the available pay load is 2,650 lbs., for distance to be flown the available pay load is obtained by proportions as follows:—

| Range in still air at 5,000 ft. | Pay Load. | Fuel and Oil. |
|---|---|---|
| 200 miles | 2,025 lbs. | 625 lbs. |
| 300 miles | 1,750 lbs. | 900 lbs. |
| 400 miles | 1,475 lbs. | 1,175 lbs. |
| 500 miles | 1,200 lbs. | 1,450 lbs. |
| 600 miles | 925 lbs. | 1,725 lbs. |
| 700 miles | 650 lbs. | 2,000 lbs. |

The performance of the machine with full load is summarised as follows:—

Max. speed: 140 m.p.h. at 1,000 ft.
Cruising speed at normal r.p.m.: 115 m.p.h. at 1,000 ft.
Service ceiling: 19,500 ft.
Stalling speed: 47 m.p.h.
Rate of climb at ground: 700 ft./min.
Rate of climb at 10,000 ft.: 900 ft./min.

This machine is capable of flying on one engine at any height up to 6,000 ft. with full load, which is a great step towards safety and reliability.

The machine has a large cabin 14 ft. 8 in. long, 3 ft. 9 in. wide, 5 ft. average height inside.

The Power Units consist of two Bristol Jupiter IX geared engines but other air-cooled engines such as the Armstrong Siddeley Jaguar Major can be fitted.

**Le Gloster A.S.31, biplan bimoteur de servitude.**

Le Gloster A.S.31 est un biplan civil de haut rendement à deux moteurs, adaptable à plusieurs emplois. Cet avion a déjà servi en mission cartographique avec grand succès pour la Aircraft Operating Company, et il a accompli un lever aérien étendu dans l'Afrique du Sud. L'appareil a fait le parcours entre l'Angleterre et l'Afrique du Sud à une vitesse moyenne de 172.8 k.p.h.

Le Gloster A.S.31 peut remplir les fonctions suivantes:—

Avion de Lever.
Avion de Voyage à Forfait.
Avion Sanitaire.
Avion Leger de Bombardement de Jour.
Avion Côtière Patrouilleur de Pêche.
Avion Postal ou Marchand.

Cet appareil est accordé un certificat anglais de navigabilité pour vol au poids total de 4.177 kg., (9,200 lb.) et comme le poids à vide est de 2.837.5 kg., (6,250 lb.) le chargement payant, y compris le poids de l'essence et de l'équipage est de 1,340 kg., (2,950 lb.). Ce chargement peut être distribué selon les besoins particuliers et le kilomètrage du parcours.

La consommation minima en croisant à 184 k.p.h., à 1,525 m., est de 125 kg. par heure d'essence, et de 18 kg. d'huile.

Déduction faite de 136 kg., pour le pilote et l'equipment, le chargement payant que l'on obtient est de 1,203 kg., Selon la longueur du parcours le chargement disponible est calculé de la maniére suivante:—

| Rayon par vent nul à 1,525 m. | Chargement Payant. | Essence et huile. |
|---|---|---|
| 320 km. | 920 kg. | 284 kg. |
| 480 km. | 794 kg. | 408 kg. |
| 640 km. | 670 kg. | 533 kg. |
| 800 km. | 545 kg. | 658 kg. |
| 960 km. | 420 kg. | 783 kg. |
| 1120 km. | 295 kg. | 908 kg. |

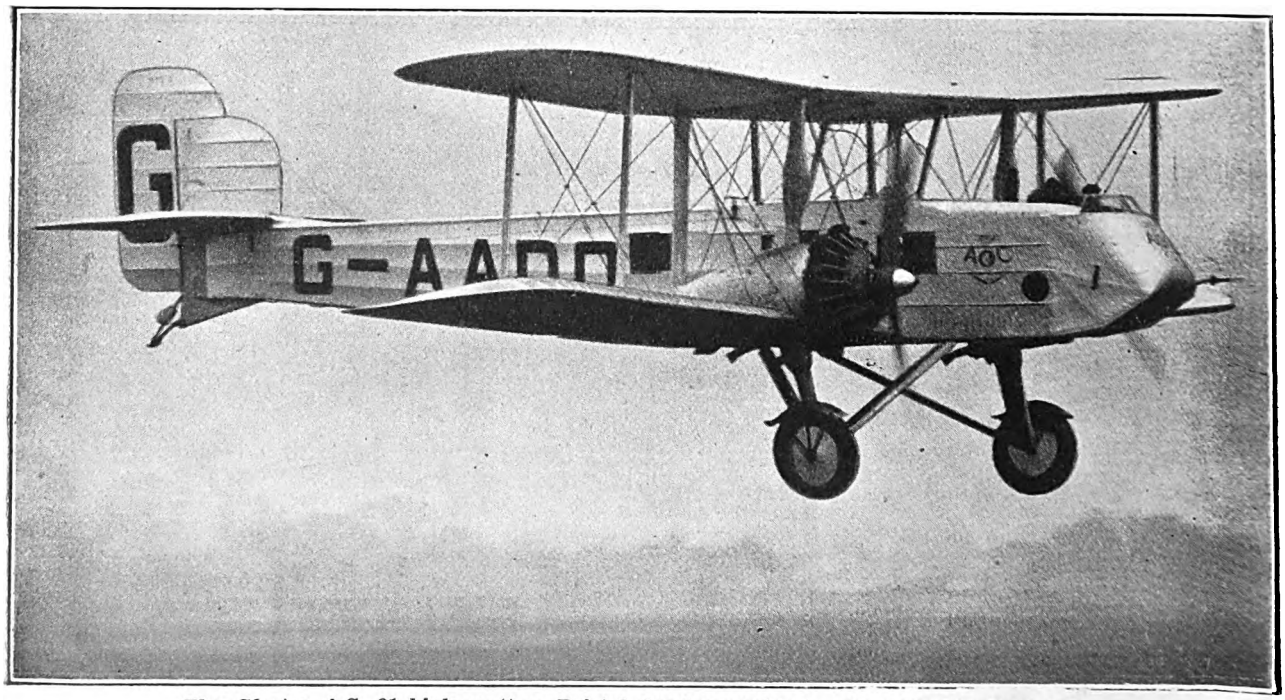
Les performances de l'appareil à plein chargement sont comme suit:—

Vitesse maxima 224 k.p.h. à 305 m.
Vitesse croisière à t/m ordinaire 184 k.p.h. à 305 m.
Plafond 5,947.5 m.
Vitesse minima 75.2 k.p.h.
Montée au sol 213.5 m./min.
Montée à 3,050 m. 274.5 m./min.

Cet avion peut continuer son vol avec un moteur en marche à toute hauteur jusqu'à 1,830 m. avec plein chargement, progrès considérable vers la sûreté et la sécurité.

L'appareil comporte une cabine longue de 4 m. 45, large de 1 m. 15, et d'une hauter moyenne de 1 m. 52.

Le groupe moteur consiste de deux moteurs Bristol Jupiter IX, démultipliés, mais d'autres moteurs à refroidissement par air peuvent être installés, tel que l'Armstrong Siddeley Jaguar Major.




The Gloster A.S. 31 biplane (two Bristol Jupiter engines).—(*"Aeroplane" photograph.*)

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# HANDLEY PAGE LTD.

## HEAD OFFICE AND WORKS:—CRICKLEWOOD, LONDON, N.W.2.

### The Handley Page Clive Mk. II.

The Clive is a twin-engined tractor biplane with two Bristol Jupiter VIII F engines which give a total horse power of 920 at 4,000 feet.

The aircraft has been designed as a medium range troop carrier and day bomber. It is perhaps the most adaptable of service aircraft in existence, as it is able to fulfil the following functions:—

(a) Troop Carrier to carry 17 fully armed troops;

(b) Freight Carrier to carry three Jupiter or similar engines within the fuselage;

(c) Petrol Carrier to carry 400 gallons within the fuselage in specially designed tanks;

(d) Bomber to carry 1,300 lb. of bombs, with an air range of 765 miles;

(e) Aerial Ambulance to carry two stretcher cases in addition to eight sitting-up cases.

A feature of the machine is that excepting the front portion of the fuselage and the engine mounting, the remainder of the structure is interchangeable with that of the all-metal Handley Page Hinaidi Mk II night bomber, which forms standard equipment of the Royal Air Force.

Two gun positions are provided, one in the nose of the aircraft and one at the rear of the cabin between the tail and main planes. There is also a prone bombing position on the starboard side of the fuselage slightly behind and to the side of the pilot.

The bomb load is distributed under the lower planes, and there is a choice of several alternative loadings.

The electrical equipment comprises identification, navigation, interior and instrument lighting, gun and clothing heating and lamp signalling, with the necessary generator to supply the current.

The wireless equipment comprises receiving and transmitting installations and a separate generator.

A special derrick and gear is provided for fixing above the extra large entrance door to the fuselage in order to facilitate the loading into the cabin of heavy equipment such as aircraft engines, of which three can be conveniently transported.

To facilitate changing engines in the field, a maintenance platform, to be fixed to the trailing edge of the lower plane, is provided, with a special ladder, which by folding may be either 4 feet, 8 feet or 12 feet long. By attaching this ladder to the platform, access is provided to the engines for their maintenance, etc. In addition, a beam is provided for attachment to the upper plane, with the necessary gear for hoisting the engines into position.

At a total loaded weight of 14,500 lbs. the Clive has a top speed of 111 m.p.h., at 4,000 ft. an initial rate of climb of 335 ft./min. and a service ceiling of 12,600 ft.

### Le Handley Page Clive Mk. II.

Le Clive est un biplan bimoteur à hélices tractives, dont les deux moteurs Bristol Jupiter VIII F développent une puissance totale de 920 CV. à 1.200 mètres.

Conçu dans le but de réaliser un appareil possédant un rayon d'action moyen et pouvant servir tant au transport d'un certain nombre d'hommes de troupe qu'aux opérations de bombardement de jour. Le Clive constitute probablement l'avion militaire le plus adaptable qui existe, car il peut répondre aux fonctions suivantes:—

(a) Transport de Troupes—il peut porter 17 hommes complètement armés;

(b) Gros Porteur—il peut porter trois moteurs Jupiter ou de type analogue, chargés à l'intérieur du fuselage;

(c) Transport d'Essence—il peut prendre à son bord, dans le fuselage, environ 1,818 litres d'essence, à l'intérieur de réservoirs de construction spéciale;

(d) Bombardement—il peut transporter 590 kgs. de bombes, avec un rayon d'action de 1.230 kms.

(e) Avion-Sanitaire—il peut servir à transporter deux blessés couchés et huit blessés assis.

Cet appareil se caractérise par ce fait que, sauf la partie avant du fuselage et les supports de moteur, tout le reste de sa structure offre une parfaite interchangeabilité avec le Handley Page Hinaidi Mk. II avion de bombardement nocturne, entièrement en métal.

L'appareil comporte deux postes de mitrailleuse, dont l'un situé tout à l'avant et l'autre à l'arrière de la cabine, entre les plans principaux et l'empennage. Il existe aussi un poste de bombardement, prévu sur le côté tribord du fuselage, légèrement à l'arrière et sur le flanc du pilote.

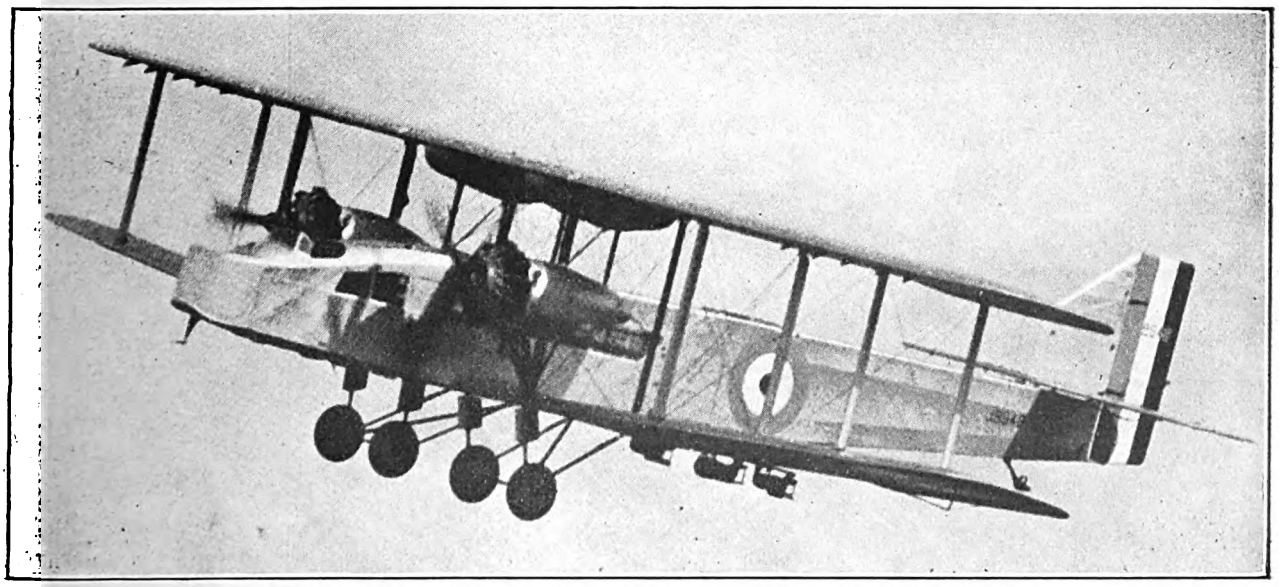
L'agencement électrique comprend feux d'identification, feux de route, éclairage intérieur et des instruments, chauffage des mitrailleuses et des vêtements, avec la génératrice nécessaire.

Quant à l'agencement de T.S.F., il comprend les installations voulues de réception et de transmission de même qu'une génératice séparée.

Il est également fourni d'un derrick spécial avec ses accessoires, que l'on peut fixer au-dessus de la large porte donnant accès à l'intérieur du fuselage, afin de faciliter le chargement dans la cabine de pièces très pesantes, telles que moteurs d'aviation.

Afin de faciliter le remplacement des moteurs en campagne, la fourniture comporte aussi une plateforme d'entretien, destinée à se fixer au bord de fuite du plan inférieur, avec une échelle pliante spéciale, à laquelle on peut—suivant le cas—donner une longueur de 1 m. 20, 2 m. 40 ou 3 m. 60. En attachant cette échelle à la plateforme, on peut ainsi gagner accès aux moteurs pour l'entretien, etc. Enfin, une poutre destinée à se fixer au plan supérieur avec les appareils de levage voulus, permet de hisser les moteurs à leurs places respectives.

Complètement chargé de manière à représenter un poids total de 6.580 kgs., le Clive donne une vitesse maximum de 178 km/h. à 1.220 mètres, une vitesse ascensionnelle initiale de 162 mètres à la minute, et un plafond pratique de 3.840 mètres.



The Handley Page Clive biplane (two Bristol Jupiter engines).

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# THE H. G. HAWKER ENGINEERING CO. LTD.

## HEAD OFFICE AND WORKS: CANBURY PARK ROAD, KINGSTON-ON-THAMES.

The H. G. Hawker Engineering Co. Ltd. was formed in 1921 from the nucleus of the old Sopwith company, a firm which made its name during the War 1914-18 as the producers of some of the best fighter aircraft of that period. The Hawker company has since its inception specialised in the design of military aircraft and it has supplied to the Royal Air Force and to the air forces of several foreign nations a considerable number of aircraft of outstanding design.

The first type to be produced for the Royal Air Force was the Woodcock, a single-seat fighter biplane with the Bristol Jupiter radial air-cooled engine. This machine was immediately successful and was adopted as one of the standard fighter types of the R.A.F.

Shortly after the appearance of the Woodcock the company produced the Danecock which was supplied as the standard single-seat fighter for the Royal Danish Naval Air Service. The Danecock was very similar to the Woodcock but was fitted with the Armstrong Siddeley Jaguar engine.

When the Royal Air Force decided to re-equip the high-altitude day-bombing squadrons the firm produced the Horsley with the Rolls-Royce Condor IIIA engine. This type was successful and was eventually selected by the R.A.F. It is still one of the standard service machines for this class of work.

The Horsley has also been successfully adapted for coastal defence purposes and in this form it is now in use in Great Britain and the Dominions and by the Greek Naval Air Service. As a torpedo-bomber this type has been extremely successful and the torpedo, which weighs approximately 2,150 lbs. (979 kgs.), is the largest that has ever been carried by a landplane. During the last fleet manœuvres excellent results were obtained with this weapon.

With the advent of metal aircraft a considerable amount of research and experimental work was done to ascertain the system and methods which were likely to offer the greatest advantages. The Hawker type of metal construction is probably the most efficient system yet devised. Simplicity throughout is the keynote of the construction and in the choice of materials every endeavour has been made to select those which are universally available. Steel and/or duralumin tubing is the basic material of the fuselage design and high tensile steel strip is used for the wing spars. All connections are by flat plates and tubular rivets. The wing ribs can be made from duralumin tube or channel aluminium or timber, and owing to the shape of the spar ease of attachment is unaffected.

Extensive trials made by the Air Ministry have resulted in the selection of Hawker aircraft for R.A.F. re-equipment in several classes. The Hart two-seat biplane fitted with the Rolls-Royce F.XI.B engine is now in production as a high-speed day bomber. One squadron is already fully equipped and a photograph of this squadron is given on another page.

The Hart is probably the most outstanding aircraft of its

Le H. G. Hawker Engineering Co. Ltd., a été établi en 1921 partant de l'ancienne société Sopwith, maison qui se fit une réputation pendant la guerre dans la construction d'appareils militaires de premier ordre. Depuis son établissement la société Hawker a spécialisé dans la construction d'appareils militaires et elle a fourni à la Royal Air Force ainsi qu'aux services d'aviation d'autres pays un grand nombre d'avions de dessin très réussi.

Le premier modèle crée pour la Royal Air Force fut l'appareil Woodcock biplan de chasse monoplace, équipé d'un moteur Bristol Jupiter en étoile à refroidissement par air. Cet avion eut un succès immédiat et fut choisi pour la classe d'avions de chasse de la Royal Air Force.

Aprè le Woodcock, la société construisite Danecock, qui fut accepté par l'Aviation Navale Danoise comme type d'avion de chasse monoplace. Le Danecock était à peu près identique au Woodcock sauf que le moteur était un Armstrong Siddeley Jaguar.

Lorsque la Royal Air Force se décida à équiper de nouveau les escadrilles de bombardement de jour aux hautes altitudes, la société développa l'appareil Horsley à moteur Rolls-Royce Condor IIIa. Ce modèle réussit bien et fut choisi enfin par la Royal Air Force. Il est encore aujourd'hui un des avions de service pour cet emploi.

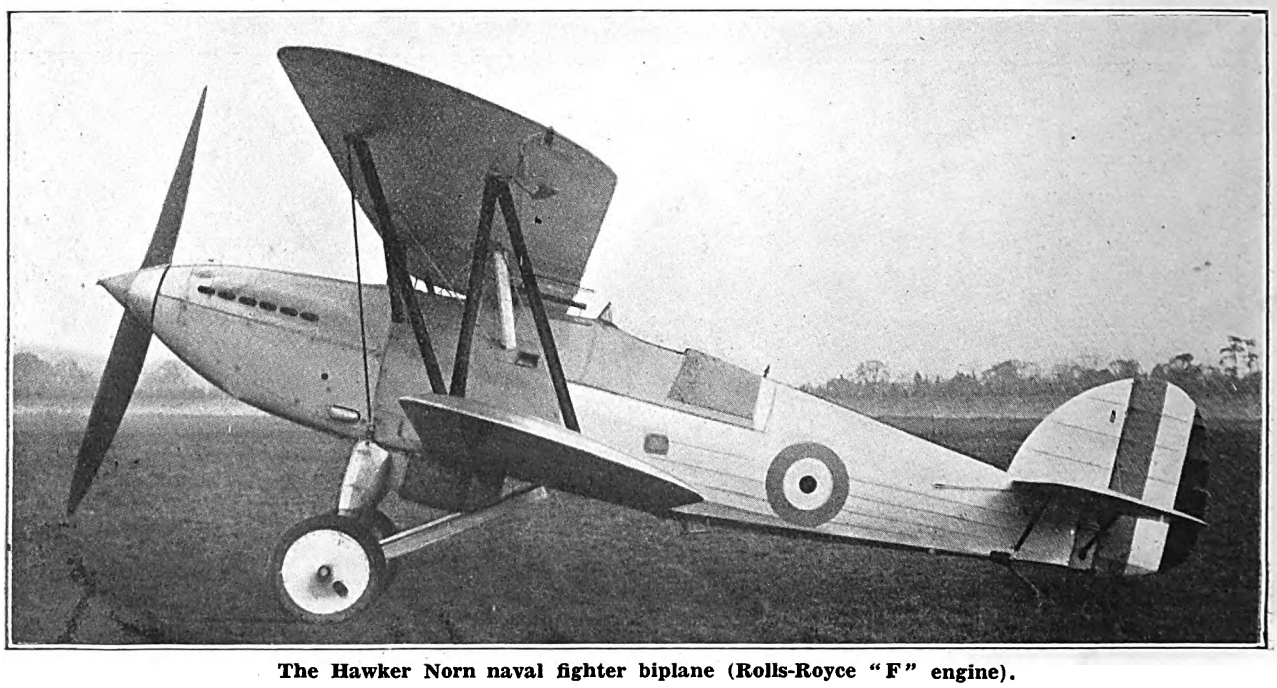
Le Horsley a également été adopté avec beaucoup de succès au service de garde côtes, et dans cette qualité est employé actuellement dans la Grande Bretagne et dans les Etates Dépendants, ainsi que par l'Aviation Navale Grecque. Comme appareil bombardier et torpilleur ce modèle a donne pleine satisfaction. La torpille, d'un poids environ de 979 kg. (2,150 lb.), est la plus grande qui ait jamais été portée par un avion terrestre. Au cours des derniers exercises de la flotte, de bons resultats furent obtenus par cette arme.

L'évolution des avions métalliques a nécessité des études très soignées et des essais progressifs. Le Système Hawker de structure métallique est probablement le plus efficace qui existe. La simplicité absolue est l'essentiel de la méthode, et la facilité de choix des matériaux. Le tube d'acier ou de duralumin est employé pour le fuselage, et de l'acier à haute résistance pour les longerons des ailes. Tous les joints sont effectués par des plaques à rivets tubulaires.

Les nervures d'aile peuvent être fabriquées de tubes ou de profiles U en duralumin, ou de l'aluminium ou en bois, et grâce à la forme des longerons l'attachement se fait sans difficulté.

A la suite de longues épreuves de la part du Ministère de l'Air les avions Hawker ont été choisis pour équiper plusieurs escadrilles de la Royal Air Force. Le biplan biplace Hart muni d'un moteur Rolls-Royce F.XI.B. est maintenant construit en série comme appareil de bombardement sur-rapide. Il y a déjà une escadrille entière de Harts, dont une photographie est reproduite dans ces pages.

Le Hart est sans doute un des plus réussis de sa classe.



**The Hawker Norn naval fighter biplane (Rolls-Royce "F" engine).**

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type which has been produced in recent years. It has a performance superior to that of any single-seat fighter in production to-day and its speed range and general layout is such that it can be utilised as a two-seat fighter, as an Army co-operation machine or as a General Purpose type.

The Hart has also been produced for duties with the Fleet Air Arm and this version differs little from the day bomber type. For accommodation in aircraft carriers the wings are made to fold and several minor modifications have been embodied to suit it to service with the fleet. As a seaplane with a pair of quickly-detachable all-metal floats the Hart shows to great advantage and it is probable that this type will be chosen for re-equipment of certain units of the Fleet Air Arm.

Another notable product of the Hawker Company is the Fury single-seat Interceptor fighter with the Rolls-Royce F.S. engine. This machine was designed to fulfil certain requirements of the Royal Air Force for a new class of fighter aeroplane. The interceptor fighter is required to have a very fast climb to high altitudes together with high speed and extreme manœuvrability at these altitudes. From a number of other aircraft the Fury was chosen by the Air Ministry to be a standard interceptor fighter in the Royal Air Force.

This machine embodies the same constructional features and outstanding performance as characterises the Hart. It possesses a remarkable degree of manœuvrability and it is undoubtedly the finest fighting aircraft in the World.

A further competitive success for the Hawker company was the choice of the Fury, adapted for fighter duties in the Fleet Air Arm, and named the Norn. The Norn may be equipped as a seaplane and it also has been strengthened up so that it may be catapulted. It is suitable for operating from an aircraft-carrier or it may be flown off the turrets of battleships and cruisers.

The selection of these types will result in the Royal Air Force equipment being superior to that of any other air force in the World and forms a striking tribute to the superiority of Hawker design and construction.

In addition to the above high-performance military types the Hawker company has produced the Tomtit light training biplane with the Armstrong Siddeley Mongoose radial engine. This machine also incorporates the Hawker patent metal construction. Several of these machines have been bought by the Royal Air Force and by the Royal Canadian Air Force.

With this machine a considerable amount of experimental work has been done in connection with instruction in "blind" or fog flying. For this both cockpits of the machine are fully equipped with instruments and the back cockpit is fitted with a hood which may be pulled over the pupil by the instructor. All controls including the tail-incidence gear are duplicated and the pupil's dashboard is indirectly-lighted and is fitted with a turn indicator. The cockpits of this machine were designed in collaboration with the R.A.F. Medical Service. They are well padded, are fitted with the Sutton harness for inverted flying and the seats which are adjustable are arranged to take the standard type of parachute.

Sufficient has been said to show that the Hawker company is fully qualified to design and construct military aircraft of all types which are comparable with, if not better than, anything else in the World.

Il a une performance meilleure que tout autre monoplace de chasse aujourd'hui, et sa rangée de vitesse et sa disposition générale lui permettent un emploi de chasseur biplace, comme avion de liaison ou de servitude.

Le Hart a été construit également pour l'aviation navale, et ce modèle diffère peu de celui de bombardement de jour. La cellule est repliable pour faciliter le stockage à bord des navires porte-avion, et quelques autres légères modifications y ont été apportées pour l'adapter aux besoins de la flotte. Comme hydravion, muni d'une paire de flotteurs métalliques largables, le Hart produit une impression favorable et il est probable que ce modèle servira de remplacement dans certaines escadrilles de l'aviation navale.

Le Fury est une autre création distinguée de la société Hawker: un monoplace de chasse équipé d'un moteur Rolls-Royce F.S. Cet appareil fut conçu pour réaliser le besoin de la Royal Air Force d'une nouvelle catégorie d'avions de chasse. Le chasseur doit avoir une montée extrêmement rapide aux altitudes élevées tout en conservant une grande vitesse et maniabilité. En concurrence avec d'autres avions le Fury fut choisi par le Ministère de l'Air à titre de chasseur type "Jockey" pour la Royal Air Force.

Cet appareil conserve les mêmes caractéristiques de construction que le Hart et une performance aussi belle. Le Fury est tout ce qui a de plus maniable et il est sans aucun doute le meilleur avion de chasse du monde.

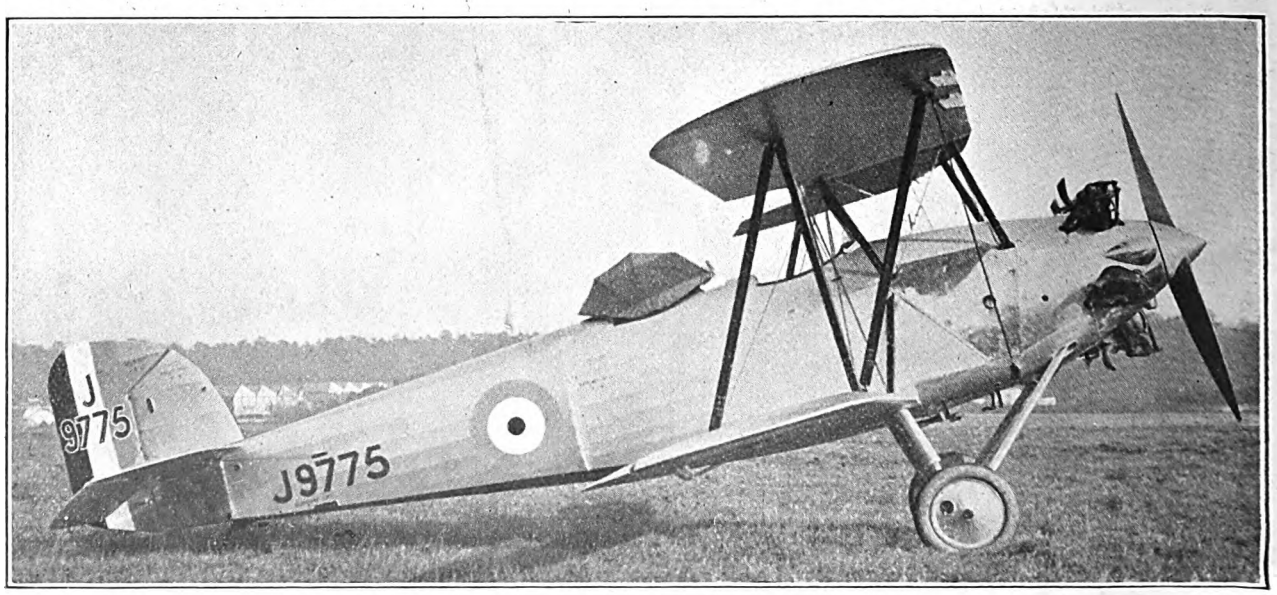
Le Fury a été choisi aussi pour l'aviation navale, adapté à ses besoins d'appareils de combat et appelé le Norn. Ce modèle peut être transformé en hydravion et la construction a été renforcé pour le lancement par une catapulte. Il peut opérer d'un navire porte-avion ou même décoller d'une tourelle de cuirasse ou de croiseur.

Par suite du choix de ces appareils le matériel de la Royal Air Force sera supérieur à celui de tout autre service aéronautique du monde, et rend témoignage aux grandes études et à la construction soignée de la société Hawker.

En outre de ces avions militaires de haute performance, la société Hawker a réalisé le biplan léger d'entrainement Tomtit, muni d'un moteur Siddeley Armstrong Mongoose en étoile. Cet appareil est également construit totalement en métal, brevet Hawker. Plusieurs de ce type ont été acquis par la Royal Air Force ainsi que par la Royal Canadian Air Force.

Des essais assidus d'instruction dans le vol "sans visibilité" —soit dans la brume—ont été effectués avec le Tomtit. A cette fin tous les deux postes de pilotage sont équipés des instruments de contrôle et celui en arrière est muni d'un capot que le moniteur peut rabattre sur l'élève. Toutes les commandes sont en double, y compris les dispositif de réglage de la queue, et la planche de bord de l'élève est éclairée et pourvu d'un indicateur de virage. L'aménagement des postes fut achevé avec la collaboration du personnel de la Royal Air Force Medical Service. Les sièges sont bien rembourrés, munis du harnais Sutton pour le vol sur le dos, et sont ajustables et permettent l'emploi des parachutes de la Royal Air Force.

Il est facile de constater d'après cet exposé que la société Hawker est bien organisée pour la production d'appareils militaires de la toutes classes, d'un haut rendement égal aux meilleurs, et même supérieur, à ceux du monde entier.




**The Hawker Tomtit biplane (Armstrong Siddeley Mongoose engine).** —(*"Aeroplane" photograph.*)

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# D. NAPIER & SON, LTD.

## HEAD OFFICE AND WORKS: ACTON, LONDON, W.3.

The principal product of this famous engineering firm is now the Napier Lion Series XI water-cooled aero-engine.

This engine develops 570 h.p. at 2,585 r.p.m. with a weight/power ratio of less than 1.75 lbs. per h.p.

The Napier Lion engine has now been in production for a number of years, but owing to the wide experience obtained with it in actual service and the development and research work which has been carried on, its power has been increased from the original 400 to its present figure of 570 h.p.

The general arrangement of the Lion is well known. It is of the broad arrow type, and has its 12 cylinders arranged in three blocks of four cylinders each. The bore is 5½ ins. and stroke 5⅛ ins. The compression ratio is 6 to 1.

The Napier engine has proved a great success and is still in demand, not only for British Air Ministry machines, but also for aircraft in all parts of the World.

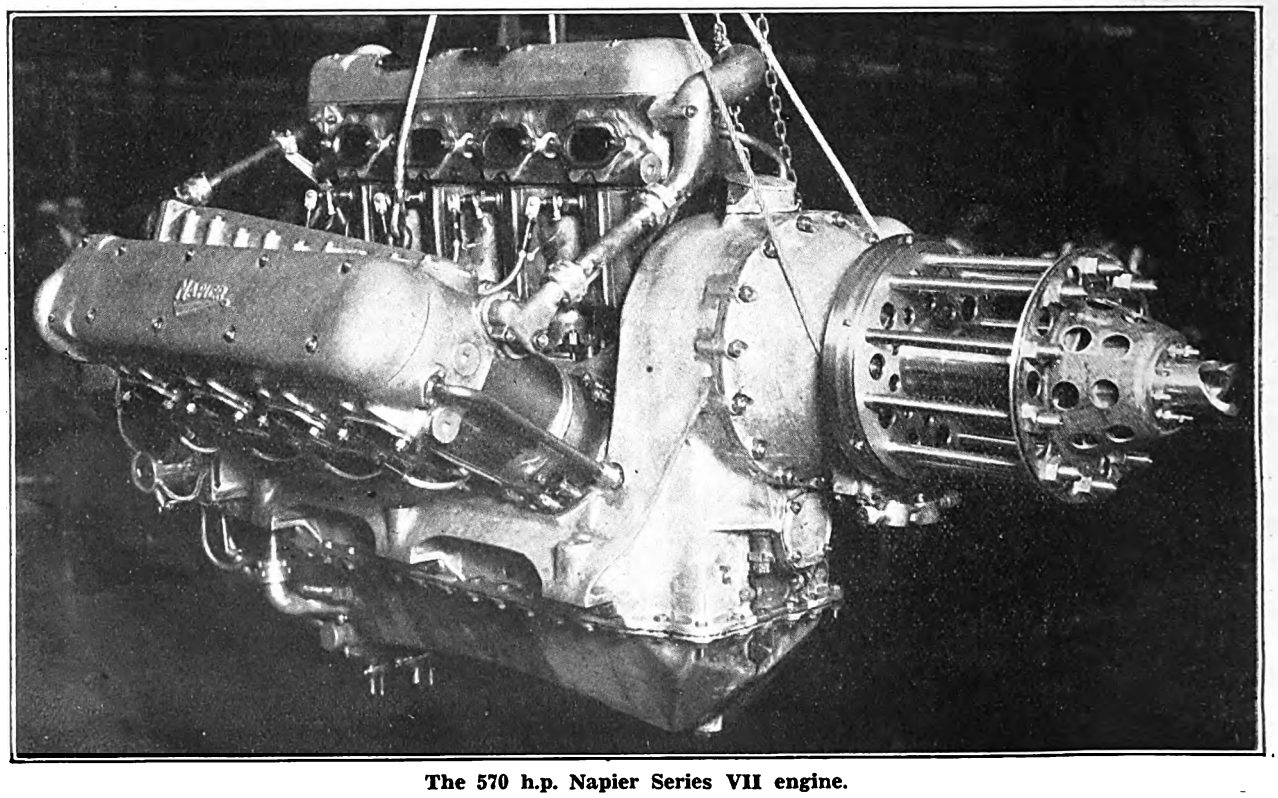
It was this type of engine which, when installed in a Fairey monoplane, made the first and only non-stop flight from England to India. The greatest formation flight ever attempted—that made by the R.A.F. Far-East Flight from England to Australia, round Australia, and back to Singapore—was made with Supermarine Southampton flying-boats, each fitted with two Napier engines.

For racing purposes the Napier company has developed this engine, until now, with the aid of a supercharger, it develops 1,320 h.p., with a weight/power ratio of .856 lb. (0.386 kg.) per h.p. This gives a higher power per 100 c.c. than any engine ever produced. This latest racing engine is the Series VIID, and was fitted to the Gloster-Napier seaplane with which Flt. Lt. G. H. Stainforth, R.A.F., set up a World's speed record of 336 m.p.h.

The Napier company have now under construction a most novel and interesting type of engine known as the Napier Rapier.

Type: Sixteen cylinder-air-cooled. Cylinders arranged in four blocks of four cylinders each, vertically opposed in "H" formation.
Power: Approximately 300.
Weight: 620 lbs.
Supercharged.
Dimensions: Length overall, 54 in., height overall, 35 in.; width overall, 21 in.
It will be obvious that, owing to its compact shape and size, light weight and other important features, it possesses distinct advantages over the radial air-cooled engine.

La production principale de ces usines fameuses est actuellement le moteur d'aviation Napier Lion série XI.
Ce moteur développe une puissance de 570 CV, à 2,585 t.p.m., tandis que le facteur de poids par puissance est moins de 0.79 kilos par cheval.
Le moteur Napier Lion a été en production depuis quelques années, mais par suite des résultats pratiques gagnés à l'aide du moteur en service actif et comme suite aux travaux d'etude et de développement qui y ont été apportés, sa puissance d'origine de 400 CV a été augmentée au chiffre actuel de 570 CV.
La disposition générale du moteur Lion est bien connue. Elle comporte 1 cylindres en "W" disposés en trois blocs de quatre cylindres chacun. L'alésage est de 139 mm. et la course de 130 mm. Le rapport de compression est de 6 à 1.
Le moteur Napier s'est éprouvé un grand succès et est encore fort recherché, non seulement pour des avions commandés par l'Air Ministry Britannique ,mais également pour des avions en toutes parties du monde.
Ce fut ce modèle de moteur qui fit le premier et unique vol de l'Angleterre aux Indes sans escale, installé dans le monoplan Fairey. D'un autre côté, le vol en formation militaire le plus notable qui ait été essayé—celui accompli par le "Far-East Flight" du R.A.F., soit de l'Angleterre en Australie, autour l'Australie, et de retour à Singapore—fut effectué par des hydravions Supermarine Southampton, muni de deux moteurs Napier chacun.
Pour les courses, la société Napier a développé ce moteur d'avantage, jusqu'à ce que, suralimenté par compresseur, il attient une puissance de 1,320 CV, tandis que le rapport de poids par puissance se réduit à 0.386 kilos par cheval. Par là nous voulons dire que la puissance par 100 c.c. de volume est la plus grande qui ait été produite par n'importe quel moteur existant. Ce moteur de course le plus récent est identifié comme Série VII-D et fut installé dans l'hydravion Gloster-Napier grâce auquel le Flt. Lt. G. H. Stainforth, R.A.F., établit un record mondial de vitesse absolu de 537.6 km.p.h.
En ce moment, les usines Napier ont en procès de construction un modèle de moteur fort nouveau et intéressant, connu par la désignation Napier Rapier.
Type: 16 cylindres à refroidissement par air, disposés en quatre blocs de 4 cylindres chacun, opposés verticalement, en forme de "H."
Puissance: Environ 300 CV.
Poids: 281.5 kilos.
Alimentation: Par compresseur.
Dimensions: Longeur totale, 1.37 m.; hauteur totale, 0.88 m.; largeur totale, 0.53 m..
Il est évident qu'il possède des avantages absolus, vu sa forme compacte et ses dimensions, ainsi que son poids sur les moteurs en étoile à refroidissement par air.



**The 570 h.p. Napier Series VII engine.**

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# THE ROBINSON AIRCRAFT CO. LTD.

## HEAD OFFICE AND WORKS: STAFFORD ROAD, WALLINGTON, SURREY.

The Robinson Aircraft Co. Ltd. was formed early in 1930 by Mr. P. G. Robinson, a pilot of considerable experience, to put on the market a light two-seat training biplane.

The first product of the company is the Robinson Redwing. In drawing up the specification for this machine, Mr. Kenworthy, the designer, aimed at a low initial cost and a low landing speed coupled with all the comfort and convenience of side-by-side seating for touring and training.

The main features of the Redwing may be divided up as follows:—

(1) Safety and reliability.
(2) Low landing speed in conjunction with an efficient type of landing gear.
(3) Stability over a wide range of flying speeds.
(4) Comfortable side-by-side seating.
(5) Folding wings.
(6) Low initial cost and low running expenses.
(7) Ease and cheapness of maintenance and repairs.
(8) Simplicity for instructional purposes.

The Redwing is fitted with the 80-88 h.p. Armstrong Siddeley Genet five-cylinder radial engine, which is a sound and reliable power-plant combining simplicity with low fuel and oil consumption.

The Redwing is a normal single-bay biplane with folding wings. The centre-section is carried above the fuselage on steel tube struts which are so arranged to allow of ease of access to the cockpit. The outer wings are hinged around the rear spar hinges and they may be folded, unfolded and locked in less than a minute.

The wing structure is of wood with fabric covering. To prevent distortion of the wing structure and constant rigging both the internal and external wing bracing have been made over the requisite strength.

The cockpit, which seats two side-by-side, is very roomy and comfortable. The seats are arranged slightly staggered so as to allow the pilot a good view forward and to give the pilot and passenger plenty of elbow room. The view from the cockpit is very good all round and practically no obstruction is caused by the one-piece windscreen which gives adequate protection to the occupants.

A large luggage locker capable of accommodating two suit cases and golf clubs is provided immediately behind the cockpit. A door is fitted to each side of the cockpit, thus providing convenient access to either seat without difficulty.

### SPECIFICATION.

Span 30 ft. 6 ins., Span, folded, 9 ft. 8 ins., Length 22 ft. 3 ins., Height 8 ft. 4 ins., Weight empty 805 lbs., Weight loaded 1,325 lbs., Speed, maximum, 95 m.p.h., Speed, cruising, 85 m.p.h., Speed, landing, 30 m.p.h., Initial rate of climb 800 ft./min., Take-off and landing run 60 yards.

Le Robinson Aircraft Co. Ltd. fut établi en 1930 par Mr. P. G. Robinson, aviateur de beaucoup d'expérience, dans le but de livrer au commerce un biplan léger biplace d'entraînement.

Le premier type de la firme est le Robinson Redwing. En fixant les caractères généraux de cet avion Mr. Kenworthy, l'ingénieur-constructeur, avait en vue des frais d'achat abordables ainsi qu'une vitesse d'atterrissage réduite toute en aménageant l'appareil pour tout le confort et toute la commodité des sièges disposés côte à côte pour le tourisme et l'entraînement.

Les avantages principaux du Redwing sont comme suit:—

(1) Sécurité et régularité de fonctionnement.
(2) Vitesse d'atterrissage réduite et train d'atterrissage efficace.
(3) Stabilité excellente à des vitesses variant entre de larges limites.
(4) Sièges confortables côte à côte.
(5) Ailes repliables.
(6) Pris d'achat et d'entretien réduits.
(7) Entretien et réparations faciles et à peu de frais.
(8) Simplicité pour l'entrainement.

Le Redwing est équipé du moteur en étoile Armstrong Siddeley Genet de 80/88 CV, groupe moteur de bonne sécurité et régularité en marche réunissant la simplicité avec une consommation faible de combustible et d'huile.

Le Redwing est un biplan normal aux ailes repliables. La partie centrale des ailes est montée sur des mâts en tube d'acier disposés de manière à donner accès libre à la carlingue. Les parties extérieures des ailes sont articulées par les charnières des longerons arrières et permettent d'être repliées, dépliées, et fixées en moins d'une minute.

L'ossature de l'aile est de bois, recouvert de toile. Pour éviter toute déformation de la carcasse d'aile, l'entretoisement intérieur et extérieur de l'aile est supérieur à la résistance minima nécessaire.

La carlingue aménagée pour deux passagers côte à côte, est fort spacieuse et confortable. Les sièges sont légèrement décalés de manière à assurer au pilote une bonne vue vers l'avant. La vue depuis la carlingue est bonne vers tous côtés et n'est guere obstruée par le pare-brise, fait d'une pièce integrale, bien que donnant assez de protection aux occupants.

A l'arrière de la carlingue est aménagée la soute de bagages, assez grande pour deux malles et des golf clubs. De côté et d'autre de la carlinque il y a des portes, ainsi donnant accès à chacun des siéges sans difficulté.

### CARACTERISTIQUES.

Envergure 9.3 m., Envergure, ailes repliées, 2.9 m., Longueur 6.8 m., Hauteur 2.5 m., Poids à vide 365 kgs., Poids total 602 kgs., Vitesse maximum 152 km.p.h., Vitesse à croisière 136 km.p.h., Vitesse d'atterrissage 48 km.p.h., Taux d'ascension au sol 244 m./min., Roulement d'envol et d'atterrissage 55 m.

The Robinson Redwing light biplane (80/88 h.p. Armstrong Siddeley Genet engine).—(*"Aeroplane" photograph.*)

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# ROLLS-ROYCE, LTD.

**WORKS: DERBY, LONDON OFFICE: 14, CONDUIT STREET, W.1.**

Rolls-Royce Ltd. from the beginning of their career as aircraft engine builders have specialised in the construction of water-cooled engines. In this Company's opinion it is only by the use of water as a cooling medium that equalised temperatures throughout the cylinders can be obtained, and at the same time the inevitable heat-dissipating surfaces can be provided in the aircraft in a form offering minimum resistance to passage through the air. The value of these features in securing low fuel consumption high cylinder output and minimum resistance, or drag, in the aircraft has been demonstrated in now numerous examples of high performance British aircraft fitted with Rolls-Royce engines.

### The "F" and "H" Engines.

The latest productions of the Rolls-Royce Company are known as the "F" and "H" types, and at the present time these engines are in very great demand for all kinds of modern high-performance aircraft.

In both these engines an effort has been made to reduce the frontal area to an absolute minimum so that the fuselage drag of the aircraft into which they are fitted can be made as low as possible.

The "F" type engine is supplied in twelve varieties, all incorporating the same main components. The advantage of this wide choice of types will be obvious to anyone familiar with the demands of the aircraft constructor or to those responsible for buying the equipment for military or naval requirements.

These twelve types are obtained by supplying the engine with three different gear ratios, that is to say:—.632:1, .552:1 and .475:1. These three gear ratios can be applied to engines of two different compression ratios, namely 7:1 and 6:1, with normal aspiration, or alternatively, by fitting superchargers either of what is known as the moderate type—that is to say, permitting a certain amount of supercharging at take-off and maintaining 500 h.p. to 3,000 ft., or the full supercharger, which is capable of maintaining the ground level rated power up to 11,500 ft. In connection with the high-compression engines, the rated output of 480 h.p. is developed at normal speed at ground level and maintained to an altitude of 3,000 ft. by opening the throttle to the fullest extent.

These engines are known by the type letter, namely "F"; a series number XI, XII or XIV, indicating which gear ratio is fitted, that is to say .632, .552 or .475 respectively; and a letter "A," "B," "MS" or "S," the letter "A" indicating 6:1 compression, "B" 7:1, "MS" moderate supercharger and "S" full supercharger.

The "H" engine is supplied fitted with a supercharger which can be fully used at ground level in order to facilitate taking off heavy aircraft from the ground or water. Two different airscrew gear ratios are provided, viz., .553 to 1 and .477 to 1. These varieties are known as the "H" XII. MS and "H" XIV. MS respectively.

Dès le début de leurs activités à titre de constructeurs de moteurs d'aviation, la firme Rolls-Royce a fait une spécialité des moteurs à refroidissement par eau. La société tient que ce n'est quen faisant emploi de l'eau comme moyen de refroidissement qu'on arrivera à obtenir des températures uniformes dans les cylindres tout en permettant de disposer les surfaces inévitables pour décharger le chaleur de manière à présenter la moindre résistance à l'avancement. L'importance de ces conditions pour arriver à une consommation faible d'essence, à un rendement de cylindre élevé, et à un minimum de résistance ou de trainée dans les constructions aéronautiques a été démontrée à maintes reprises par des avions britanniques de haute performance équipés de moteurs Rolls-Royce.

### Les moteurs "F" et "H."

Les dernières productions de la société Rolls-Royce sont connues comme types "F" et "H" et à l'heure actuelle ces moteurs sont fort recherchés pour les avions modernes de haute performance de tous genres.

Dans tous les deux moteurs on a essayé de réduire la section frontale au minimum absolu de manière à diminuer autant que possible la résistance du fuselage des avions dans lesquels les moteurs sont installés.

Le moteur de type "F" est fourni en douze modèles dont tous se composent des mêmes pièces élémentaires. L'avantage qu'offre ce grand choix de modèles doit être évident pour tous ceux qui connaissent les exigences des constructeurs d'avions ainsi que pour toutes personnes chargées des achats destinés a l'équipement militaire et naval.

Ces douze variations sont obtenus en prévoyant les moteurs pour trois rapports d'engrenage différents, c'est à dire: comme 0,632:1, 0,552:1, et 0,475:1. Ces trois réductions peuvent être combinées avec deux rapports de compression différents, soit de 7:1, et 6:1; et tout ceci soit à aspiration normale, soit en installant des compresseurs de suralimentation, parmi lesquels encore on offre le choix entre le modèle dénommé type modéré, c'est à dire permettant d'un certain surchargement à l'envol et conservant les 500 CV jusqu'à 900 m. d'aititude, ou bien le compresseur à pleine charge qui est capable de maintenir la puissance à niveau de sol jusqu'à 3500 m. En ce qui concerne les moteurs à haute compression, la puissance nominale de 480 CV est développée à vitesse normale à niveau de mer et maintenue jusqu'a à une altitude de 900 m. à plein gaz.

Ces moteurs sont identifiés par la lettre de modèle "F," ainsi que par un chiffre de série, soit XI, XII, ou XIV, suivant le rapport d'engrenage monté, c'est à dire 0,632, 0,552 ou 0.475; et puis par une lettre "A," "B," "MS" ou "S," la lettre "A" indicant une compression de 6:1, "B" de 7:1, tandis que "MS" indique le suralimenteur modéré et "S" le suralimenteur de pleine charge.

Le moteur "H" est muni d'un compresseur de suralimentation pour vol à pleins gaz à niveau de mer pour faciliter l'envol des avions pesants du sol ou de l'eau. Il y est pourvu deux rapports d'hélice différents, à savoir 0,553:1, et 0.477:1. Ces variations sont connues par la désignation respective de "H" XII. MS, et "H" XIV. MS.

| | F.XI, XII and XIV A | F.XI, XII and XIV B | F.XI, XII and XIV MS | F.XI, XII and XIV S | Condor IIIB | H MS | |
|---|---|---|---|---|---|---|---|
| Bore ... ... ... | 5·0 ins (127 mm) | 5·0 ins (127 mm) | 5·0 ins (127 mm) | 5·0 ins (127 mm) | 5·5 ins (139 mm) | 6·0 ins (152·4 mm) | Alesage |
| Stroke ... ... ... | 5·5 ins (139·7 mm) | 5·5 ins (139·7 mm) | 5·5 ins (139·7 mm) | 5·5 ins (139·7 mm) | 7·5 ins (190 mm) | 6·6 ins (167·6 mm) | Course |
| Normal rated B.H.P. :— | | | | | | | Puissance nominale normale au frein, CV:— |
| At ground level ... | 490 | 480 | 525 | — | 665 | 825 | Au niveau du sol |
| 3,000 ft. ... ... | — | 480 | 500 | — | 665 | — | à 914 metres |
| 11,500 ft. ... ... | — | — | — | 480 | — | — | à 3,500 metres |
| Normal R.P.M. ... | 2250 | 2250 | 2250 | 2250 | 1900 | 2000 | Vitess normale, t/m |
| Maximum B.H.P. ... | 560 | 530 | 620 | 550 | — | 920 | Puissance maximum au frein, CV |
| Maximum R.P.M. ... | 2700 | 2700 | 2700 | 2700 | 2100 | 2300 | Vitesse maximum, t/m |
| Fuel consumption ... | 31 gals/hr (141 lit/hre) | 28 gals/hr (127·3lit/hre) | 35 gals/hr (159 lit/hre) | 32 gals/hr (145·4lit/hre) | 41 gals/hr (186 lit/hre) | 53 gals/hr (241 lit/hre) | Consommation de combustible |
| Oil consumption ... | 5 pts/hr (2·84 lit/hre) | 5 pts/hr (2·84 lit/hre) | 5 pts/hr (2·84 lit/hre) | 5 pts/hr (2·84 lit/hre) | 10·4 pts/hr (5·9 lit/hre) | 9 pts/hr (5·1 lit/hre) | Consommation d'huile |
| Weight of engine ... | 865 lbs (392 kgs) | 865 lbs. (392 kgs) | 900 lbs (408 kgs) | 900 lbs (408 kgs) | 1364 lbs (618·7 kgs) | 1460 lbs (662·2 kgs) | Poids du moteur |

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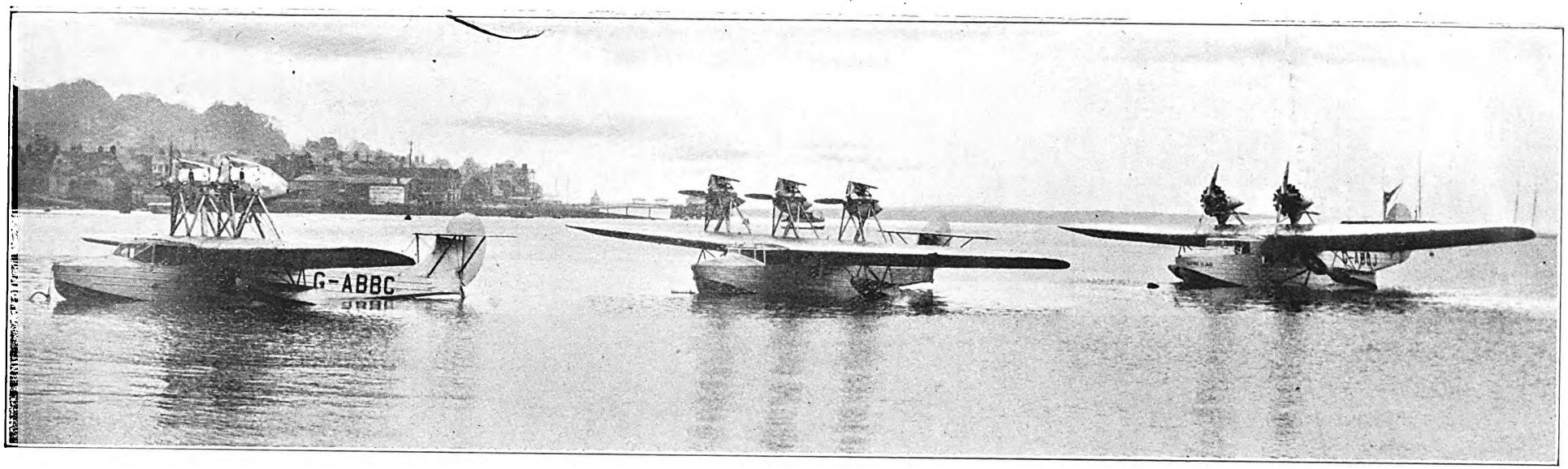
SAUNDERS-ROE, LTD.
HEAD OFFICE AND WORKS: COWES, ISLE OF WIGHT.




### The Saro Cutty Sark.

The Saro Cutty Sark is a four-seat cabin amphibian flying-boat which can be fitted with any engine or engines developing a minimum of 210 h.p. The model illustrated has two 105-115 h.p. Cirrus Hermes engines mounted in streamline nacelles over the wing.

The cabin has accommodation for four people seated in two pairs. This cabin is entirely in front of the wing and it is completely enclosed so that the occupants have an excellent all-round view together with adequate comfort and protection.

The Cutty Sark has a span of 45 ft., an overall length of 34 ft. 4 ins., and an overall height of 11 ft. 2 ins. The weight empty is 2,430 lbs., and the maximum permissible weight is 3,700 lbs. It has a top speed of 100 to 109 m.p.h. and a cruising speed of from 85 to 90 m.p.h. The minimum duration is 4 hours. The price is from £3,500 at the Works.

Le Saro Cutty Sark est un hydravion amphibie à quatre places avec conduite intérieure qui peut être équipé d'un ou de plusieurs moteurs développant un minimum de 210 CV. L'appareil illustré est muni de deux moteurs Cirrus Hermes, de 105-115 CV., montés en fuseaux au dessus de la cellule.

La cabine comporte quatre sièges en deux paires. Elle est entièrement en avant de l'aile et offre le maximum de visibilité et de confort aux passagers.

Le Cutty Sark a une envergure de 13.7 m. et une longeur de 10.5 m. Le poids à vide est de 1,103 kg.; poids maximum chargé 1,680 kg. Il a une vitesse maxima de 160-174 k.p.h. et une vitesse croisière de 136-144 k.p.h. Autonomie, 4 heures. Le prix de vente à l'usine est à partir de £3,500.

### The Saro Windhover.

The Saro Windhover is a six-seat cabin amphibian flying-boat which can be fitted with any engine or engines developing a minimum of 315 h.p. The model illustrated is fitted with three 120 h.p. D.H. Gipsy II engines mounted in streamline nacelles over the wing.

The Windhover has accommodation for six people, four forward of the wing and two below the wing in an enclosed cabin. The cabin is very comfortably equipped and dual controls may be fitted if desired.

The Windhover has a span of 54 ft. 3 ins., an overall length of 41 ft. 4 ins. and a height of 12 ft. 3 ins. The weight empty is 3,320 lbs. and the maximum permissible weight is 5,500 lbs. It has a top speed of 103 to 115 m.p.h. and a cruising speed of from 88 to 98 m.p.h. The minimum range is 4 hours. The price is from £4,530 at the Works.

Le Saro Windhover est un hydravion amphibie à six places avec conduite intérieure équipé d'un ou de plusieurs moteurs développant un minimum de 315 CV. Le modèle reproduit ici est muni de trois moteurs D.H. Gipsy III. de 120 CV. montés en fuseaux au dessus de la voilure.

Le Windhover peut transporter six personnes, quatre en avant, et deux sous l'aile, dans une cabine "limousine," qui est soigneusement aménagée. L'équipement comporte sur demande des commandes doubles.

L'avion a les caractéristiques suivantes:—Envergure 16.55 m., Longueur 12.6 m., Hauteur 3.73 m., Poids à vide 1,507 kg., Poids total maximum 2,497 kg., Vitesse maxima 169-184 k.p.h., Vitesse croisière 141-157 k.p.h., Autonomie 4 heures. Le prix de vente à l'usine est à partir de £4,530.

### The Saro Cloud.

The Saro Cloud is an eight- to ten-seat cabin amphibian flying-boat which can be fitted with any engine or engines developing a minimum of 600 h.p. The model illustrated is fitted with two 300 h.p. Wright Whirlwind engines in streamline nacelles mounted over the leading edge of the wing. The cabin has accommodation for eight to ten people, but, as with the Cutty Sark and the Windhover, this may be arranged to suit the requirements of the buyer.

The Cloud has a span of 64 ft. and overall length of 49 ft. 9 ins. and a height of 13 ft. 3 ins. The weight empty is 5,250 lbs. and the maximum permissible weight is 10,000 lbs. It has a top speed of 112 to 120 m.p.h. and a cruising speed of from 95 to 102 m.p.h. The duration of the machine is from 4 to 6 hours. The price is from £7,600 at the works.

Le Saro Cloud est un hydravion amphibie de huit ou dix places à conduite intérieure, avec un ou plusieurs moteurs développant un minimum de 600 CV. La photographie montre l'appareil muni de deux moteurs Wright Whirlwind de 300 CV., montés en fuseaux au dessus du bord d'attaque de l'aile.

La cabine est aménagée pour huit ou dix personnes, mais ainsi qu'avec le Cutty Sark et le Windhover, l'équipement est arrangé selon les désirs de l'acheteur.

Les caractéristiques du Cloud sont comme suit:—Envergure 19.5 m., Longueur 15 m., Hauteur 4 m., Poids à vide 2,383 kg., Poids maximum total 4,540 kg., Vitesse maxima 179-192 k.p.h., Vitesse croisière 152-163 k.p.h. Autonomie de 4 a 6 heures. Le prix de vente à l'usine est à partir de £7,600.

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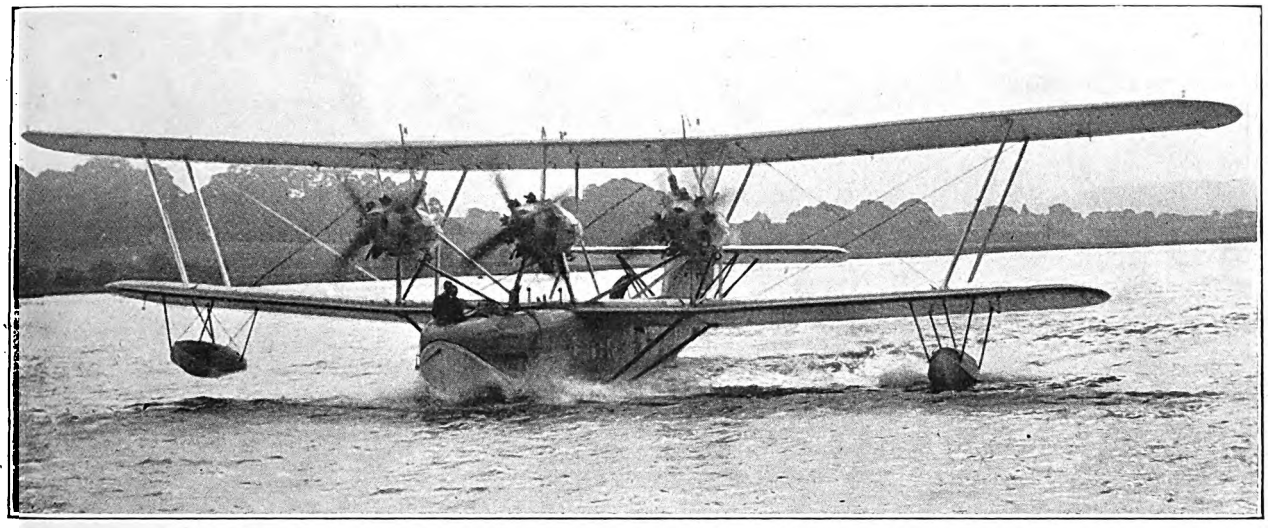
# SHORT BROS. (ROCHESTER & BEDFORD) LTD.

## HEAD OFFICE AND WORKS: ROCHESTER, KENT.



The Short Calcutta (three 450 h.p. Bristol Jupiter engines).—("Aeroplane" photograph.)

### The Short Calcutta.

Short Brothers (Rochester and Bedford) Ltd. have been building aeroplanes since 1909 and for a number of years have been specialising in the construction of seaplanes. Perhaps the best known of their latest products is the Calcutta boat-seaplane which is being used by Imperial Airways Ltd. on the Mediterranean section of their route to India. The French Government has recently bought one of these machines for test.

The Calcutta is a three-engined biplane flying-boat. The hull is entirely built of duralumin which has been specially treated by the anodic oxidation process to render it immune against corrosion. There are two steps and the rear one has been streamlined so that it creates the minimum amount of drag. Lateral stability is obtained through two streamlined and stepped duralumin floats supported beneath the lower wings by streamline steel-tube struts.

Because of the Short method of construction the hull is quite free from any interior obstruction and the passenger cabin with accommodation for 15 passengers is extremely roomy. There are two seats side-by-side with dual control for the pilots in front of the wing.

The wings which are of unequal span are remarkable for the fact that there are only one pair of interplane struts on each side. The ailerons are in the top wing only. The method of construction is that developed by the firm with duralumin box-spars of special section. The ribs are built of duralumin tubes. The covering is of fabric.

The engines are mounted in three streamline nacelles between the wings. These nacelles are monocoque structures supported by duralumin tubes. The three Bristol Jupiter geared engines are mounted on box-plates. The oil tanks are in the nacelles and the fuel is carried in two 140 gallon tanks in the upper centre-section.

The tail unit is a monoplane structure with a cantilever fin and balanced rudder. The tailplane, which is adjustable in flight, is stayed with steel-tube struts to the hull. The elevators are balanced and there is a servo-rudder to make the rudder control lighter.

A great feature of the Calcutta is its amazingly fine performance on the water. During the official trials at Felixstowe it was demonstrated that the Calcutta can be flown off the water in 42 seconds with only two outboard engines running with an all-up weight of 21,100 lbs.

#### SPECIFICATION.

Span 93 ft., Length 66 ft., Height 23 ft. 3 in., Wing area 1,825 sq. ft., Weight empty 12,820 lbs., Disposable load 9,680 lbs., Weight loaded 22,500 lbs., Maximum speed at sea-level 123 m.p.h., Cruising speed 100 m.p.h., Landing speed 60 m.p.h., Rate of climb at sea level 610 ft./min., Service ceiling 11,000 ft., Time to 10,000 ft. 30 min., Range (480 galls. fuel) 650 miles.

### Le Short Calcutta.

Le maison Short Brothers (Rochester and Bedford) Ltd., s'est occupée de la construction d'avions depuis 1909 et depuis un certain nombre d'années elle a spécialisé dans les appareils marins. Un de leurs derniers produits, peut-être le mieux connu, est l'hydravion Calcutta qui a été mis en service par Imperial Airways Ltd. sur la section Méditerrannée de la route aux Indes. Aussi le gouvernement français vient d'acquérir un de ces hydravions.

Le Calcutta est un hydravion biplan tri-moteur. La coque est faite de duralumin entièrement, traité spécialement par le procédé d'oxydation anodique pour le rendre insensible à la corrosion. Il y a deux redans et la partie arrière est effilée pour reduire la trainée au minimum la stabilité latérale est assurée grâce aux deux nageoires effilés à redans en duralumin, disposés au dessous des ailes inférieures par des mâts fuselés en tube d'acier.

Vu le système de construction "Short," la coque est libre de toute obstruction à l'intérieur et la cabine des voyageurs, prévue pour 15 personnes, est fort spacieuse. Il y a deux sièges côte à côte avec commande double pour les pilotes à l'avant de l'aile.

Les ailes, d'envergure différente, sont remarquables du fait qu'il n'est pourvu qu'une seule paire de mâts d'entroisement de chaque côté. Aussi ce n'est que l'aile supérieure qui est munie d'ailerons. La construction est celle qui a été évoluée par ces établissements comportant des longerons-caisson en duralumin de section spéciale. Les nervures se composent de tubes en duralumin. Le revêtement est de toile.

Les moteurs se trouvent installés en trois nacelles fuselées entre les ailes. Ces nacelles son de construction monocoque, supportées par des tubes en duralumin. Les trois moteurs Bristol "Jupiter" à réducteur sont montés sur des plateaux-caissons. Les réservoirs d'huile sont logés dans les nacelles-mêmes et le combustible est contenu en deux réservoirs de 630 litres chacun dans la section supérieure et centrale de l'aile.

La queue est de construction monoplan à empennage cantilever et gouvernail compensé. Le plan de queue, réglable en vol, est entretoisé par rapport à la coque par des mâts en tube d'acier. Les gouvernails de profondeur sont compensés et il y est pourvu d'un servomoteur pour rendre plus facile la commande du gouvernail.

Une particularité intéressante de l'avion Calcutta est la performance excellente sur l'eau. Au cours des épreuves officielles à Felixstowe il fut démontré que le Calcutta est à même de s'envoler de la surface d'eau en 42 secondes avec les deux moteurs latéraux seulement en fonctionnement, tout en étant chargé d'un poids total de 9,550 kils.

#### CARACTERISTIQUES.

Envergure 28.346 m., Longueur 20.117 m., Hauteur 7.087 m., Surface portante 169.5 m., Poids à vide 5,820 kgs., Charge utile 4,390 kgs., Poids total, en ordre de vol, 10,210 kgs., Vitesse maximum 198 km.h., Vitesse commerciale 161 km.h., Vitesse d'amerrissage 96.6 km.h. Vitesse ascensionnelle au depart 186 m./min., Plafond de service 3,355 m., Montée à 3,048 m. 30 min., Rayon d'action (2.18 litres d'essence) 1,040 km.

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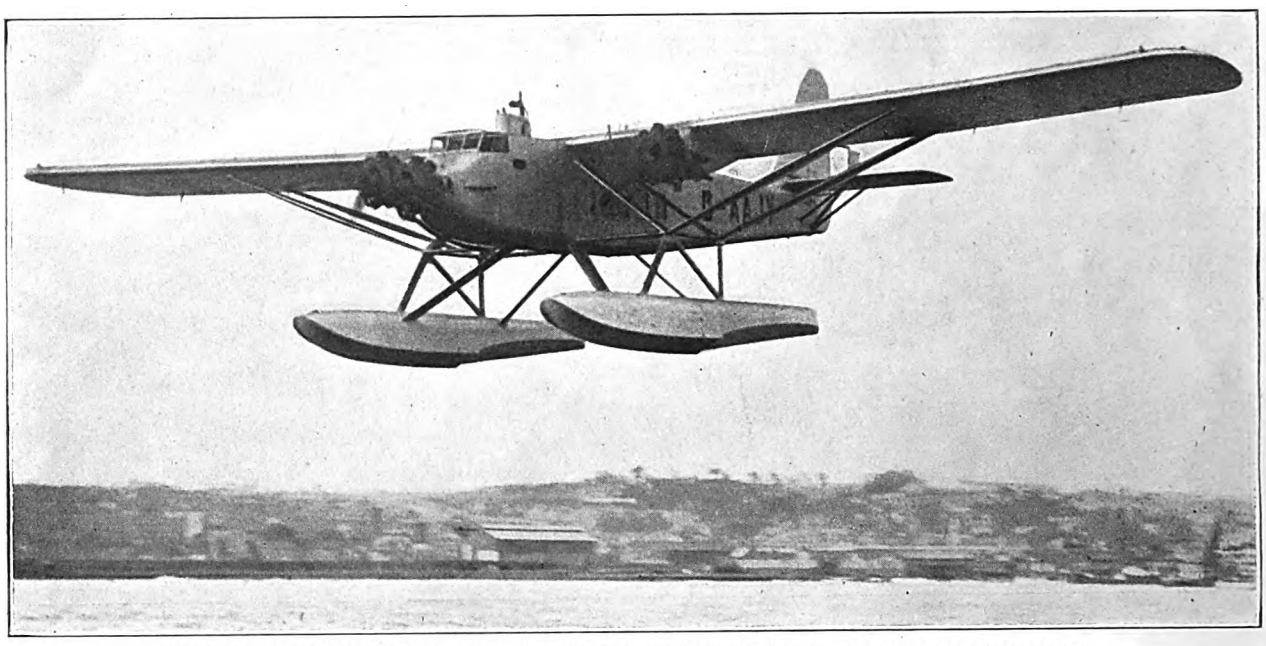

The Short Valetta (three 450 h.p. Bristol Jupiter engines).—("Aeroplane" photograph.)

### The Short Valetta.

The latest member of the Short Commercial Aircraft Family is the Valetta which has just emerged from the official trials at Felixstowe where it was demonstrated that the estimated performance for this machine was on the conservative side.

The Valetta is probably the largest monoplane float seaplane in existence. The machine is a high-wing braced-monoplane and can be equipped with either a float- or land-undercarriage as desired.

The passenger-carrying accommodation is specially spacious and chairs for eighteen passengers are arranged in rows of three in the cabin with a gangway between pairs and single chairs. The cabin is well-lit and the embossed panels in the roof can be easily let down on hinges for the inspection of the controls and wiring. Entrance to the cabin is through a door on the port side. The forward sloping float strut ingeniously opens to form a companionway from the float.

The pilots sit side-by-side in a glazed cabin forward of the wing and have a remarkably good view over the nose engine. Above and aft of their heads is the Bristol gas-starter and generator for the electric current.

Aft of the pilots is a compartment for the radio operator with the latest Marconi equipment. The operator is properly supplied with a desk, stool and cupboard.

Further aft still comes the passenger cabin which has already been described. Next is the steward's pantry with all the appurtenances of his trade. The fully-equipped lavatory is also aft of the cabin. Right aft is the baggage compartment.

The structure of the Valetta is similar to the other Short machines and therefore incorporates all the features which the long practical experience of the firm has proven to be of value. The fuselage is of the usual monocoque style with a stressed metal skin. The wings have duralumin spars and ribs like the Calcutta with a similar covering of fabric.

The three geared Bristol Jupiter engines are mounted one in the nose of the fuselage and the others forward of the leading edge of the wings. The fuel tanks which hold 175 gallons each are in the wing-roots between the spars.

#### SPECIFICATION (*Seaplane*).

Span 107 ft., Length 69 ft. 8 in., Height 19 ft. 6 in., Wing area 1,382 sq. ft., Weight empty 14,535 lbs., Disposable load 7,865 lbs., Weight loaded 22,400 lbs., Maximum speed at sea-level 136 m.p.h., Cruising speed 105-110 m.p.h., Landing speed 65 m.p.h., Rate of climb at sea-level 850 ft./min., Service seiling 14.000 ft., Time to 10,000 ft. 17.5 min., Range (350 galls. fuel) 520 miles.

### Le Short Valetta.

Le dernier venu de la série des avions commerciaux Short est l'appareil Valetta lequel vient de subir ses épreuves officielles à Felixstowe desquelles il resort que la performance actuelle est supérieure à celle estimée.

La Valetta est sans doute l'hydravion monoplan à flotteurs le plus grand existant. C'est un monoplan suréleve haubanné lequel peut être équipé soit de nageoires soit d'un train d'atterrissage, suivant désiré.

L'aménagement pour les passagers est exceptionellement spacieuse; les 18 fauteuils de voyageur sont disposés en rangs de trois chacun dans la cabine, le couloir etant disposé entre des fauteuils doubles et uniques. La cabine est bien illuminée et les tôles embouties du plafond peuvent facilement être rabuttues sur leurs charnières pour l'inspection des commandes et du câblage. L'entrée à la cabine se fait par une porte de babord. Le mât incliné avant de nageoire s'ouvre de manière ingénieuse pour fairs une passerelle entre le flotteur et la coque.

Les pilots sont assis côte à côte dans une cabine vitrée à l'avant de l'aile, ayant de cette manière une fort bonne vue audessus du moteur installé dans le nez. Au-dessus et à l'arrière de leurs têtes se trouve le démarreur à gaz "Bristol" et le générateur pour le courant électrique.

A l'arrière du pilote se trouve un compartiment pour le radio-télégraphiste, agencé de l'équipement de T.S.F. Marconi le plus moderne.

Plus à l'arrière encore on arrive à la cabine des voyageurs dont nous venons de parler déjà. Plus loin se trouve la cuisine du steward, celui-ci ayant à sa disposition tout l'outillage de son métier. Egalement à l'arrière de la cabine se trouve la toilette, aménagée de manière complète. Tout à l'arrière il y a la soute à bagages.

La construction de la Valetta est pareille aux autres appareils Short et, par conséquent, elle comporte tous les traits caractéristiques bien éprouvées par la longue expérience de la firme. Le fuselage est du modèle monocoque ordinaire à revêtement métallique sous tension. Les ailes comportent des longerons en duralumin et des nervures pareils à ceux de la Calcutta à entoilage identique.

Les trois moteurs Bristol Jupiter à réducteur sont montés l'un dans le nez du fuselage et les autres à l'avant du bord d'attaque des ailes. Les réservoirs de combustible, d'un contenu de 790 lires chacun, se trouvent logés dans la partie épaisse des ailes entre les longerons.

#### CARACTERISTIQUES.

Envergure 32.613 m., Longueur 21.234 m., Hauteur 5.944 m., Surface portante 128.3 sq. m., Poids à vide 6.600 kgs., Charge utile 3,570 kgs., Poids total, en ordre de vol 10.170 kgs.), Vitesse maximum 219 km.h., Vitesse commerciale 169-177 km.h.. Vitesse d'amerrissage, 104 km.h. Vitesse ascensionnelle au depart 259 m./min., Plafond de service 4.270 m., Montée à 3,038 m., Rayon d'action 830 km. (1,220 litres d'essence).

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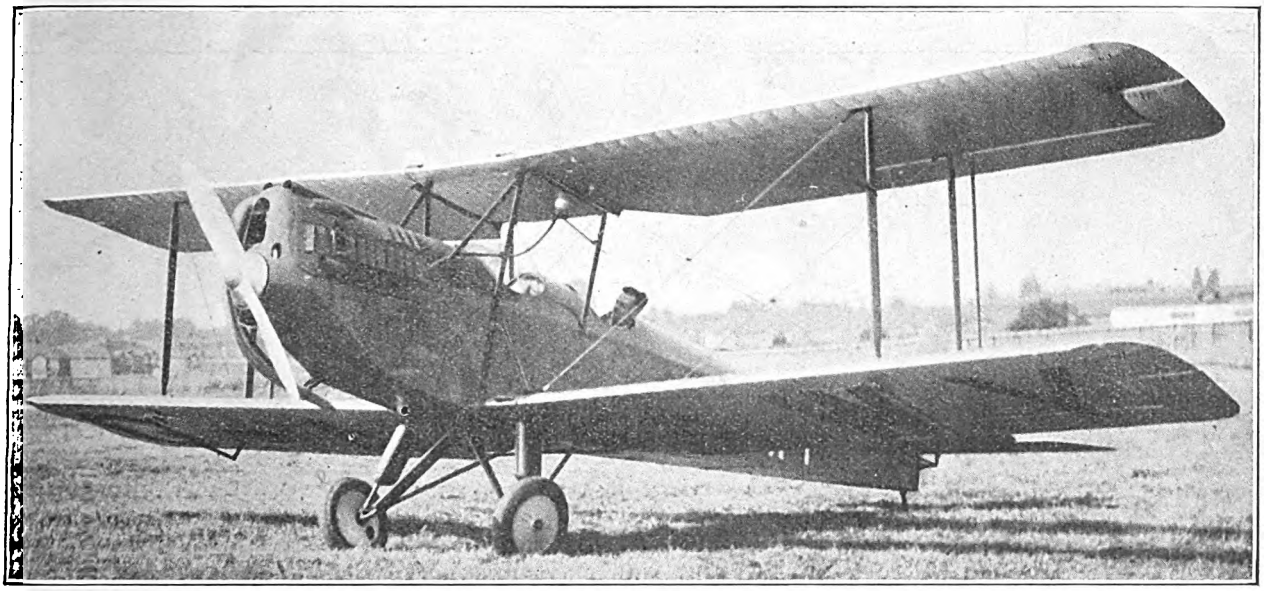
# SPARTAN AIRCRAFT, LTD.

## HEAD OFFICE AND WORKS: WESTON, SOUTHAMPTON.



**The Spartan Arrow Biplane (Cirrus-Hermes engine).** —(*"Aeroplane" photograph.*)

Spartan Aircraft, Ltd., are the manufacturers of the Spartan Arrow two-seat light biplane and the Spartan three-seat light biplane. The aircraft built by this company are notable for the fact that they all incorporate a number of interchangeable features which make them particularly suitable for use abroad away from the source of supply of spares.

The three-seat Spartan biplane in general appearance and arrangement resembles the standard light biplane in most respects. The front cockpit has accommodation for two people in tandem either facing each other or both facing forward. If only one passenger is carried the front seat may be covered over and dual control may be fitted if desired.

The engine is the 105/115 h.p. Cirrus Hermes.

The most interesting feature of this machine, however, is the degree of interchangeability of various components. All four wings are identical and interchangeable and may be used for top or bottom wings on either side of the fuselage. This is made possible by the use of a symmetrical wing section together with special fittings on the spars for the attachment of struts and interplane bracing. All four ailerons are interchangeable. The rudder and right and left elevator flaps are identical and interchangeable. The fin may also be used for either right or left hand tail-plane. All the main bracing wires are of the same size and length. And finally, the right side of the divided undercarriage is interchangeable with the left side.

The latest production of Spartan Aircraft, Ltd., is the Arrow biplane. In this machine the Clark "Y" wing section is used in place of the symmetrical section and therefore the wings are not interchangeable, but a special spare "key" wing may be supplied which may be used to replace any one of the four standard wings. The two sides of the elevators and of the undercarriage are still interchangeable as are the four ailerons, and in place of the interchangeable bracing wires one spare wire can now be supplied which will take the place of any of the main bracing wires which are used.

The Arrow is a normal single-bay folding wing biplane. It can be supplied with a variety of engines including the Cirrus III, the Cirrus Hermes, the D.H. Gipsy I or the D.H. Gipsy II.

The crew are accommodated in tandem open cockpits and complete dual controls are fitted. The seats are very comfortable and free from draughts and both cockpits are provided with side doors. Behind the rear cockpit there is a large locker which has an extension for the accommodation of long articles such as fishing rods, golf clubs, etc.

The weights and the performance of the Arrow vary according to the type of engine fitted. With the D.H. Gipsy I the Arrow has a top speed of 90-100 m.p.h. and a cruising speed of 80-83 m.p.h. With the D.H. Gipsy II, it has a top speed of 103-105 m.p.h. and a cruising speed of 85-90 m.p.h. With the Cirrus-Hermes it has a top speed of 101-103 m.p.h. and a cruising speed of 82-85 m.p.h.

Spartan Aircraft Ltd. construit le biplan léger biplace Spartan Arrow et le biplan léger triplace Spartan. Les avions construits par cette compagnie se distinguent par le fait qu'ils comportent tous un certain nombre de pièces interchangeables, ce qui les rend particulièrement propres à servir à l'étranger loin de la source de rechanges.

Le biplan triplace Spartan ressemble par son aspect général et sa disposition au biplan léger normal dans la plupart de ses caractéristiques. Le poste avant peut recevoir deux personnes en tandem, soit se faisant face l'une à l'autre soit toutes deux tournées vers l'avant. Si l'avion ne porte qu'un seul passager le siège avant peut être couvert et les commandes doublées au besoin.

Le moteur est le Cirrus Hermes de 105/11 5CV.

Toutefois le trait le plus intéressant de cet avion, c'est le degré d'interchangeabilité de ses divers éléments. Toutes les quatre ailes sont identiques et interchangeables et peuvent être utilisées comme ailes supérieures ou inférieures d'un côté ou de l'autre du fuselage. Cette particularité est rendue possible par l'usage d'un profil d'aile symmétrique et de ferrures spéciales sur les longerons pour la fixation des mâts et du haubannage interalaire. Tous les quatre ailerons sont interchangeables. Le gouvernail de direction et les parties droite et gauche du gouvernail de profondeur sont identiques et interchangeables. Le plan fixe aussi peut être employé comme stabilisateur à droite ou à gauche. Tout les principaux fils de haubannage sont de la même grosseur et de la même longueur. Et finalement, le côte droit du châssis divisé est interchangeable avec le côtè gauche.

Le dernier produit de Spartan Aircraft Ltd. est le biplan Arrow. Dans cet appareil il est fait usage du profil d'aile Clark "Y" au lieu de la section symmétrique, de sorte que les ailes ne sont pas interchangeables, mais il peut être fourni d'une aile "passe-partout" de réserve capable de prendre la place de l'une quelconque des quatre ailes normales. Les deux côtés du gouvernail de profondeur et du châssis d'atterrissage sont toujours interchangeables de même que les quatre ailerons, et à la place des haubans interchangeables la maison peut fournir aujourd'hui un seul fil de rechange qui prendra la place de n'importe lequel des principaux fils de haubannage utilisés.

L'avion Arrow est un biplan normal à ailes repliables. Il peut se fournir avec divers moteurs tels que le Cirrus III, le Cirrus Hermes, le D.H. Gipsy I ou le D.H. Gipsy II.

L'équipage est logé dans des postes en tandem et toutes les commandes sont doublées. Les sièges sont très confortables et à l'abri des courants d'air, et il y a des portes latérales aux deux postes. Derrière le poste arrière se trouve une grande soute avec prolongement pour recevoir des articles longs tel que cannes à pêche, golf-clubs, etc.

Les poids et la performance de l'Arrow varient suivant le type de moteur équipant l'appareil. Avec le moteur D.H. Gipsy I, l'Arrow a une vitesse maximum de 158-161 km/h. et une vitesse croisière de 129-134 km./h. Avec de moteur D.H. Gipsy II il a une vitesse maximum de 166-169 km/h. et une vitesse croisière de 137-145 km./h. Avec le moteur Cirrus Hermes il a une vitesse maximum de 164-166 km/h. et une vitesse de croisiè de 132-137 km./h.

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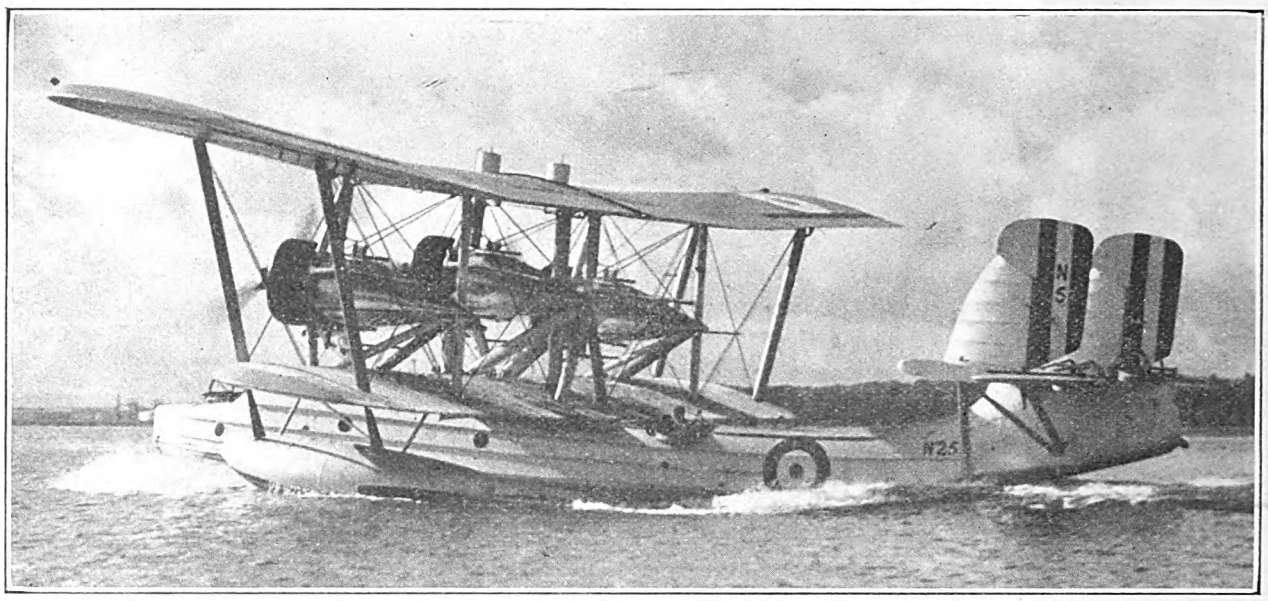
# THE SUPERMARINE AVIATION WORKS, LTD.

HEAD OFFICE, WORKS AND SLIPWAYS: WOOLSTON, SOUTHAMPTON.




The Supermarine Southampton X flying-boat (three Armstrong Siddeley Panther engines).

The Supermarine Aviation Works Ltd., which company is now owned by Vickers (Aviation) Ltd., has specialised in the production of flying-boats of various types, and in the last ten years it has turned out several very noteworthy sea-going aircraft.

The Supermarine Southampton twin-engined reconnaissance flying-boat with two Napier Lion engines has proved to be one of the most notable successes in post-war aircraft design. This type is one of the standard reconnaissance flying-boats in use in the Royal Air Force, and machines of this type have also been supplied to the Royal Australian Air Force, the Japanese Naval Air Service, and the Argentine Naval Air Service.

The latest version of this class of flying-boat is known as the Southampton X, which is illustrated on this page.

The Supermarine company has also specialised in high-speed seaplanes, and each of the three post-war Schneider Trophy Contests which have been won by Great Britain have been done with a Supermarine machine.

The 1929 Contest was won by Flt. Lt. Waghorn, R.A.F., in a Supermarine S-6 (Rolls-Royce "R" engine) at a speed of 328.63 m.p.h., and this same machine, flown by Sq. Ldr. Orlebar, A.F.C., R.A.F., holds the World's Seaplane Speed Record at 357.7 m.p.h., which is actually the fastest recorded speed obtained by any aeroplane, either landplane or seaplane.

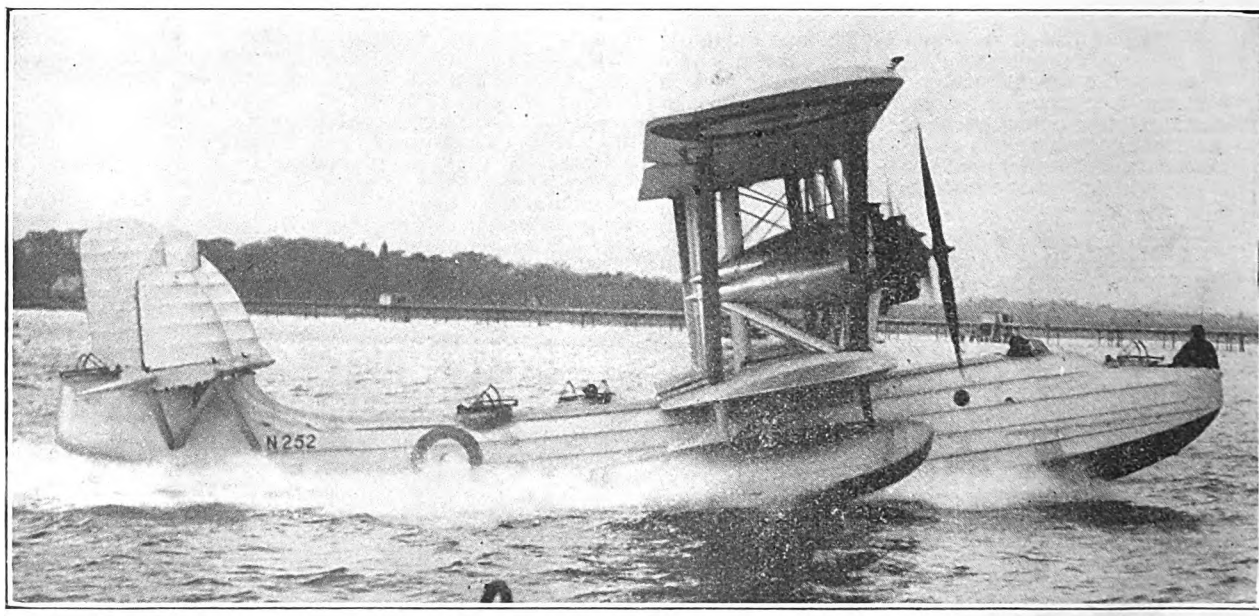
La société Supermarine qui est maintenant la propriété de la société Vickers (Aviation) Ltd., s'est spécialisée dans la construction d'hydravions divers, et pendant la dernière dizaine d'années a présenté plusieurs appareils très réussis.

Le Supermarine Southampton, hydravion de reconnaissance à deux moteurs Napier Lion, s'est prouvé un des plus grands succès des modèles évolués depuis la guerre.

Cet avion est de la classe officielle des hydravions de reconnaissance de la Royal Air Force, et un nombre a été fourni aussi à la Royal Australian Air Force, et aux services aéronautiques navales du Japon et de l'Argentine.

Le dernier exemple de ce type est le Southampton X, dont nous reprodusions ici la photographie.

La société Supermarine a concentré aussi au développement des hydravions à vitesse ultra-rapide, et à chaque concours depuis la guerre de la Coupe Schneider gagné par l'Angleterre, l'avion vainqueur a été un Supermarine. Le concours en 1929 fut gagné par le Flight Lieut. Waghorn, R.A.F., avec le Supermarine S-6 (moteur Rolls-Royce "R"), à une vitesse de 525.8 k.p.h., et ce même avion dans les mains du Squadron Leader Orlebar, A.F.C., R.A.F., détient le Record du Monde de Vitesse pure, classe hydravions, avec une vitese de 575.7 k.p.h., ce qui est, en effet, la plus grande vitesse constatée qui a jamais été atteint par un avion même terrestre.




The Supermarine Southampton X flying-boat (three Armstrong Siddeley Panther engines).

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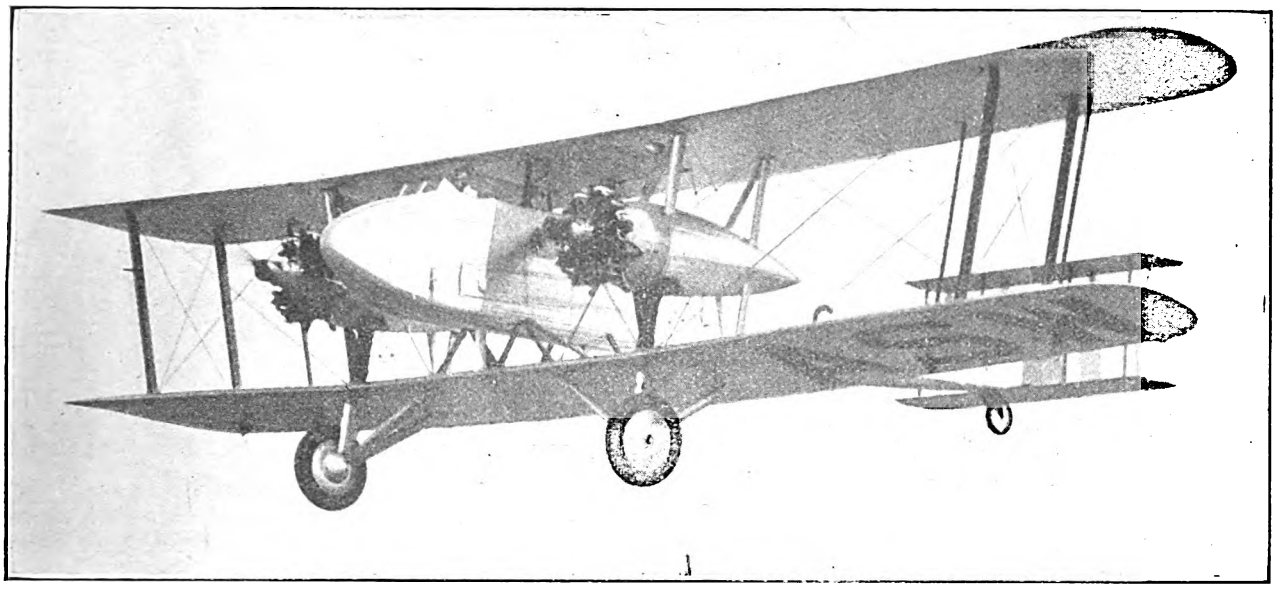
## VICKERS (AVIATION) LTD.

**HEAD OFFICE: VICKERS HOUSE, BROADWAY, WESTMINSTER, LONDON, S.W.1. WORKS: WEYBRIDGE, SURREY.**



**The Vickers Vellore biplane (two Bristol Jupiter engines).** —(*"Aeroplane" photograph.*)

### Vickers Commercial Aircraft.

The two latest types of commercial aircraft produced by Vickers (Aviation) Ltd., are the Viastra 12-seat all-metal monoplane and the Vellore twin-engined freight carrier.

The Viastra has been developed with the object of providing aircraft operators with a cheap, fast and reliable aeroplane. It is constructed entirely of metal, including the covering of the wings, fuselage and tail-unit.

One of the most interesting features of the Viastra is that it can be adapted for use as a single- twin- or triple-engined machine and with these arrangements a variety of engines may be fitted.

The Viastra has accommodation for twelve passengers in a large cabin. Two baggage compartments with a total capacity of 100 cub. ft. and lavatory accommodation are provided.

The Vellore is a high-speed freight-carrier with two Bristol Jupiter engines. It has been expressly designed for use on services organised for the rapid transport of goods and mail.

The enclosed cabin has seating accommodation for eight passengers and there is a subsidiary luggage compartment with a capacity of 17 cubic feet. On the roof of the cabin is a travelling block and tackle for the loading of freight through a large hinged door in the floor of the fuselage.

The Vellore has a maximum speed of 138 m.p.h., a cruising speed of 120 m.p.h., and with only one engine running it can maintain its height with full load at 80 m.p.h. For a range of 300 miles, and cruising at 2/3 full power, the Vellore can carry a pay load of 4,300 lbs.

### Avions de Transport Vickers.

Les deux derniers modèles d'avions de transport fabriqués par la maison Vickers sont le Viastra, monoplan entièrement métallique à 12 places, et le Vellore, biplan marchand à deux moteurs.

Le Viastra représente un avion rapide, sûr et à prix modéré. Sa structure entièrement métallique, revêtement des ailes, du fuselage et de l'empennage compris, assure des frais d'entretien économiques.

On notera surtout que la construction du Viastra permet un aménagement d'un, deux ou de trois moteurs, et par conséquent l'installation de différents moteurs.

Le Viastra prend douze voyageurs dans une cabine spacieuse. Il y a aussi un cabinet de toilette et deux soutes à bagages avec une portée totale de presque 3m.

Le Vellore est un transporteur très rapide de frêt, à deux moteurs Jupiter. Il a été construit seulement pour le transport de marchandises et de courrier postale.

Néanmoins, la cabine pourrait accommoder huit personnes, et il y a une soute à bagages d'un ½m³. Au plafond de la cabine il y a une poulie roulante pour le chargement du frêt par une grande porte à charnières dans le plancher.

Le Vellore a une vitesse maxima de 220.8 km.p.h., et elle est capable de maintenir sa ligne de vol avec plein chargement à une vitesse de 128 km.p.h. avec un moteur.

Avec un rayon d'action de 480 km., et à 2/3 de la puissance, le Vellore transport un poids utile de 1,954 kg.

**The Vickers Viastra monoplane (two Bristol Jupiter engines).**

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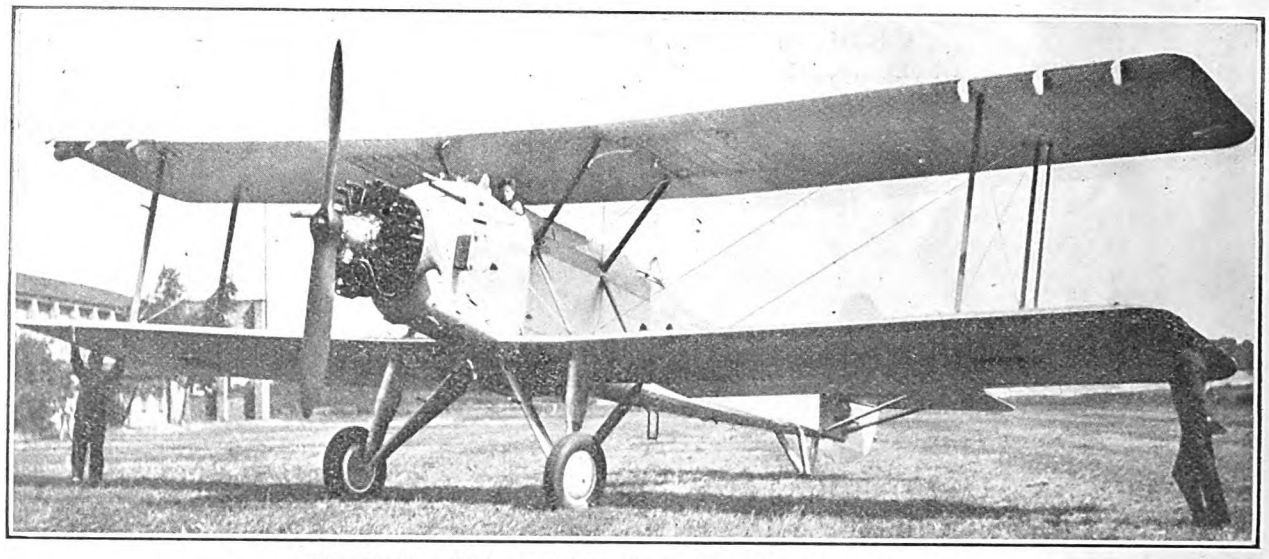

The Vickers Vildebeest (Armstrong Siddeley Panther e ngine).

### Vickers Military Aircraft.

The two latest types of military aircraft produced by Vickers (Aviation) Ltd. are the Vildebeest torpedo-carrying and bombing biplane and the Vespa two-seat Army co-operation biplane.

The Vildebeest may be fitted with either the Bristol Jupiter X.F engine which develops 505 h.p. at 2,000 r.p.m. at 12,000 ft. (3,660 m.), or the Armstrong Siddeley Panther (Jaguar-Major) engine which develops 545 h.p. at 2,090 r.p.m. at 3,000 ft. (915 m.).

The structure of this machine is of metal, chiefly duralumin, with fabric covering. The type of metal construction used is that which has been developed over a considerable period by Vickers (Aviation) Ltd. and is used with great success in all types of machines produced by the company.

The Vildebeest carries a crew of two. The pilot is situated immediately behind the engine and in front of the wings. The observer and gunner is situated behind the trailing edge of the wings and has a clear view of fire aft. The torpedo or bomb load is carried below the fuselage between the two units of the divided undercarriage.

#### SPECIFICATION.

Span 49 ft., Length 36 ft. 8 ins., Height 14 ft. 6 ins., Wing area 728 sq. ft., Weight loaded 7,955 lbs.

The Vespa is a two-seat biplane which can be adapted to various military uses but is more usually equipped as an Army co-operation or reconnaissance biplane. It is fitted with the 450 h.p. Armstrong Siddeley Jaguar VIc geared radial air-cooled engine.

Particular attention has been paid to providing the crew with good all-round vision. The fuselage is carried midway between the wings so that it is possible to bring the two cockpits near the top plane. The pilot's cockpit is situated directly under the top centre-section which is cut away between the spars. The pilot's vision is on a line with the chord of the wing so that he has a wide angle of view both above and below the top plane. The observer's cockpit is immediately behind the rear spar of the centre-section and he is armed with a Vickers gun on a movable mounting.

Provision is made for the installation of wireless apparatus, electrical and oxygen equipment, bomb-racks for eight 20-lb. bombs, full camera gear, etc., in addition to the armament of two machine guns, one of which is fixed and fires through the airscrew.

The structure of the Vespa is of metal, mainly duralumin with the principal fittings of high tensile steel and the covering is of fabric.

Vickers (Aviation) Ltd. have supplied a number of Vespas to the Bolivian Government where they are giving very satisfactory service in operation from aerodromes well over 10,000 ft. above sea level. They have also supplied a number to the Irish Free State Air Force.

#### SPECIFICATION.

Span 50 ft., Length 33 ft., Height 10 ft. 6 ins., Wing area 576 sq. ft., Weight empty 2,882 lbs., Military load 483 lbs., Weight loaded 4,370 lbs., Speed, max., 146 m.p.h., Speed at 9,480 ft. 139 m.p.h., Speed at 14,760 ft. 130 m.p.h., Landing speed 49.5 m.p.h., Climb to 9,480 ft. 7.8 mins., Ceiling 26,000 ft.

### Avions Militaires Vickers.

Les deux derniers modèles militaires de la société Vickers sont le biplan torpilleur bombardier Vildebeest et le biplace de co-operation de corps d'armée Vespa.

Le Vildebeest est équipé d'un moteur Bristol Jupiter X.F. développant 505 CV à 2,000 t/m à 3,660 m. (12,000 ft.), ou d'un Armstrong Siddeley Panther (Jaguar-Major) donnant 545 CV à 2,090 t/m à 915 m. (3,000 ft.).

La structure de cet avion est métallique, la plupart en duralumin avec revêtement en toile. Ce genre de construction métallique est le résultat de longues recherches chez la société Vickers, qui en obtient de grands succés dans tous leurs appareils.

Le Vildebeest comporte deux places, dont celle du pilote est immédiatement derrière le moteur, et en avant de la cellule. L'observateur-mitrailleur, placé en arrière de la voilure, a un champ de tir bien dégagé. La Torpille ou chargement de bombes est suspendu sous le fuselage entre l'atterrisseur sans essieu.

#### CARACTERISTIQUES.

Envergure 14.935 m., Longeur 11.175 m., Hauteur 4.471 m., Surface portante 67.75 m., Poids charge 3,610 kg.

Le Vespa est un biplan biplace de servitude mais généralement aménagé pour la reconnaissance ou la co-opération militaire. Il est muni d'un moteur en étoile Armstrong Siddeley Jaguar VIc, démultiplié.

La question d'une bonne visibilité dans tous les sens a reçu beaucoup d'étude. Le fuselage est à distance égale entre les deux ailes de façon que les deux postes soient rapprochés du plan supérieur Celui du pilote est situé directement en dessous de la partie centrale de l'aile qui est échancrée entre les deux longerons. La ligne de vue du pilote est au niveau de l'aile, ce qui lui donne une grande visibilité au dessus et en dessous de l'aile supérieure. Le poste de l'observateur est immédiatement en arrière du longeron de fuite, et il est armé d'une mitrailleuse Vickers sur une tourelle mobile.

Des aménagements ont été prévus pour un appareil de T.S.F., l'équipement électrique et inhalateur, pour huit bombes de 9 kg., appareil photographique etc., outre l'armement de deux mitrailleuses, dont une est fixe et synchronisée avec l'hélice.

La structure du Vespa est métallique, principalement en duralumin, avec les pièces principales en acier à haute résistance, et le revêtement de toile.

La société Vickers a fourni au Gouvernement Bolivien une série de Vestas qui donnent de très bons résultats bien que leurs bases d'opération soient à 3,000 m. au dessus du niveau de la mer. Une autre série a été livré à l'aviation de l'Irish Free State.

#### CARACTERISTIQUES

Envergure 15.24 m., Longeur 10.06 m., Hautèur 3,195 m., Surface portante 53.51 m., Poids à vide 1,307 kg., Chargement militaire 219 kg., Poids chargé 1,983 kg., Vitesse maxima 235 k.p.h., Vitesse à 3,000 m. 224 k.p.h., Vitesse à 4,500 m. 209 k.p.h., Vitesse d'atterrissage 80 k.p.h., Montée à 3,000 m. 7.8 minutes, Plafond 7,925 m.

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# THE WESTLAND AIRCRAFT WORKS, LTD.

HEAD OFFICE AND WORKS: YEOVIL, SOMERSET.

**The Westland Wessex monoplane (three Armstrong Siddeley Genet-Major engines).**

### The Westland Wessex.

The latest commercial product of the Westland company is the Wessex three-engined six-seat cabin monoplane. This machine is fitted with three Armstrong Siddeley Genet-Major radial air-cooled engines.

The Wessex has been designed for safety, comfort and economy of first cost and maintenance.

From the point of view of safety, the Wessex maintains its height with full load at 4,000 ft. (1220 m.) with any two of its three engines running and this height can be increased to 6,000 ft. (1830 m.) by the use of high compression engines.

From the point of view of comfort the smooth running of the three Genet-Major engines and the special manner in which they are mounted obviates all vibration. The interior furnishing and the accommodation for the passengers sets the very highest standard. Openable windows of non-splintering glass are arranged along the sides of the cabin and heating and ventilation are under the control of the passengers. Aft of the cabin there is a lavatory.

From the point of view of economy, in the first place the initial cost of the Wessex is only £3,990. The pay load of 1,100 lbs. (498 kgs.) is big enough to make the Wessex a profitable proposition for any concern which is operating aircraft for the conveyance of passengers. The Wessex normally transports five passengers at a cruising speed of 95 m.p.h. (153 km.p.h.). If a lavatory is not required the number of passengers may be increased to seven and if the machine is solely required for the conveyance of freight all the seats may be removed whereupon a pay load of 1,200 lbs. (544 kgs.) of goods or mail may be carried.

A feature of the economical running costs of the Wessex is its low cost of maintenance. This has been achieved by the use of metal in certain parts of the structure and by the use of a braced monoplane wing which eliminates the necessity of constant adjustments in rigging. The question of maintenance is obviously closely connected with reliability as the more reliable the machine is the less call there is for expensive maintenance work.

Other important features of the Wessex are its ease of control, good visibility and its suitability for air survey work.

Ease of control has been carefully considered so as to relieve the pilot of any strain. Rudder bias gear and a tail-adjusting gear are fitted which allow the machine to be flown with hands and feet off the controls.

Visibility from the cabin is excellent. The pilot is placed in front of the wing where he has a good view sideways and forward and a periscope arrangement enables him to see backwards over the wing. The passengers have an excellent view because of the high monoplane wing and the small size of the outboard engines.

The Wessex is particularly suitable for air survey work. The wide type undercarriage allows an excellent downward view to be obtained from the cabin. The high performance of the machine together with its ability to maintain height on two engines are further advantages.

SPECIFICATION.

Pay load (passengers) 1,100 lbs., Pay load (freight) 1,200 lbs. Cruising speed 95 m.p.h., Duration at cruising speed 5½ hours, Ceiling with full load on two engines 4,000 ft., Ceiling with full load on two engines (high compression) 6,000 ft., Service ceiling 12,000 ft.

### Le Westland Wessex.

Le modéle le plus récent construit par la société Westland est le monoplan Wessex, à six places et trois moteurs Armstrong Siddeley Genet-Major, en étoile et refroidi par l'air.

Les buts principaux de la conception du Wessex sont la sécurité, le confort, et les frais économiques d'achat et d'entretien.

Du point de vue de sécurité, le Wessex puet maintenir sa hauteur avec plein chargement à 1,220 m., (4,000 ft.) avec n'importe quelle paire de moteurs en marche, et, équipé de moteurs à haute compression, peut se maintenir ainsi à 1,830 m., (6,000 ft.).

A l'égard du confort, la marche égale des trois moteurs Genet-Major, et leur montage scécial supprime toute vibration. L'habillage et l'équipement général de la cabine est de premier ordre. Les fenêtres ouvrables et de glace de sûreté, sont aménagées tout le long des parois, et les passagers peuvent régler le chauffage et la ventilation eux-mêmes. A l'arrière se trouve un cabinet de toilette.

Du point de vue de l'économie, en premier lieu le prix de vente revient seulement à £3,990. Le poids utile de 498 kg., (1,100 lb.) est assez élevé pour assurer à l'acheteur du Wessex une proposition avantageuse dans le transport de passagers. Normalement, le Wessex porte cinq personnes à une vitesse croisière de 153 k.p.h., (95 m.p.h.) Sans lavabo, la cabine comporterait sept places, et pour le transport marchand, sans sièges, le poids utile s'élève à 544 kg., (1,200 lb.).

Les frais d'entretien très réduits se sont réalisés par l'emploi de métal dans certaines parties de la structure, et par une cellule monoplane avec haubans, qui évite le réglage frequent du haubannage. La question d'entretien est évidemment alliée à celle de sûreté, car plus on est sûre de l'appareil plus il est facile de réduire la main d'oeuvre pour l'entretien.

Une vue dégagée et la facilité de manoeuvre sont à noter, ainsi qu'une aptitude pour les entreprises phototopographiques.

La maniabilité a été soigneusement étudiée pour éviter au pilote tout effort inutile. L'équipement comporte des dispositifs de réglage pour les gouvernails de direction et de profondeur, qui permet le vol sans toucher aucune des commandes.

Les vues de la cabine sont excellentes. Le pilote est à l'avant de l'aile, d'où il a une vue étendue de côté et au devant, et un dispositif périscopique lui permet de regarder en arrière par dessus l'aile. Les voyageus ont une vue bien dégagée par suite de l'aile surélevée et des fuseaux compactes des moteurs.

Le Wessex est surtout adaptable aux besoins cartographiques. L'atterrisseur à grande voie permet une vue étendue au dessous de la cabine, et le haut rendement de l'appareil avec la faculté de maintenir le vol sur deux moteurs, donnent de la satisfaction dans ce genre de travail aérien.

CARACTERISTIQUES.

Charge payante (passagers) 498 kg., Charge payante (marchande) 544 kg., Vitesse croisière 153 k.p.h., Autonomie 5½ heures, à vitesse croisière, Plafond avec plein chargement et 2 moteurs 1,220 m., Plafond avec plein chargement et 2 moteurs à haute compression 1,830 m., Plafond normal 3,660 m.

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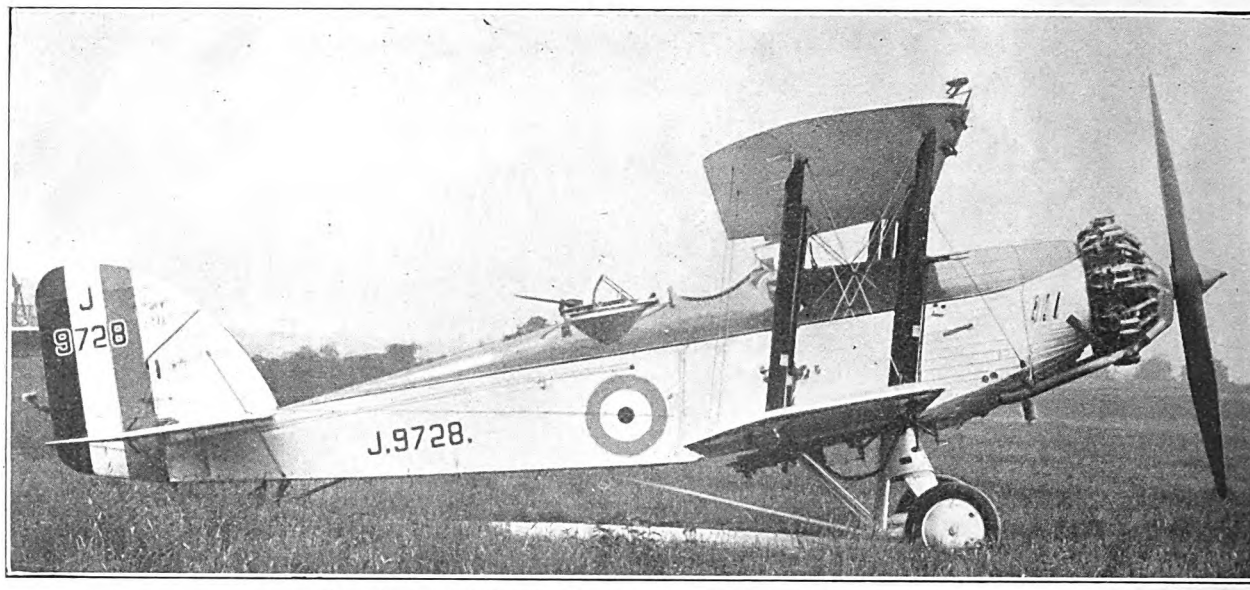


The Westland Wapiti V biplane (Bristol Jupiter engine).

**The Westland Wapiti.**

The principal military product of the Westland company is the Wapiti two-seat General Purposes biplane.

This machine was designed by the Westland company to fulfil the requirements of the British Air Ministry for a machine to undertake a number of different duties such as bombing, reconnaissance, photography, etc. As the result of the excellent performance of the Wapiti it has been adopted by the Royal Air Force, the Royal Australian Air Force and the South African Air Force for general purpose duties.

The most recent development of the type, which is known as the Wapiti Mk. V. has been produced to fit it for Army Co-operation duties. This machine is normally fitted with the Bristol Jupiter VIII.F radial air-cooled engine but it is designed for the installation of any air or water-cooled engines of similar power.

The Wapiti V is an all-metal two-seat two-bay biplane which is primarily suitable for Army-Co-operation work but it can also be used for reconnaissance, bombing, photography, long-range desert patrol and advanced training.

It has a longer fuselage than that used on the earlier type and this extra length makes the machine particularly suitable for certain duties where varying loads may have to be carried in the back cockpit.

A new type of undercarriage has been designed which incorporates efficient wheel brakes and these in conjunction with a tail-wheel make the machine very manœuvrable on the ground.

As with the earlier type an overload of 600 lbs. (272 kgs.) can be carried and the machine is so arranged that the whole of this overload may be carried in the fuselage. The additional equipment which may be carried include an auxiliary petrol tank and the necessary fuel, spare wheel, spare tail-skid, fitter's tool box, engine spares, normal rations, water, bedding, personal equipment, etc. A message picking-up hook is carried below the fuselage and the bomber's aperture in the floor of the fuselage has been increased to give a better field of view. Other improvements include an increased wireless accommodation, collapsible windscreen for the observer and an arrangement enabling the lap type parachute for the observer to be carried in a tray for immediate use.

The armament consists of two machine guns, one of the fixed Vickers type firing forward through the airscrew and the other of the Lewis type mounted on a movable mounting over the back cockpit. A bomb load up to 580 lbs. (263 kgs.) may be carried and a prone bombing position complete with all the necessary instruments is provided below the pilot's cockpit. The camera is carried in the first bay aft of the back cockpit and ample accommodation is provided for the stowage of plates and other material. Other equipment includes full wireless apparatus, oxygen equipment, etc.

The land undercarriage of the Wapiti may be removed and twin long single-step floats substituted thus converting the machine into a very efficient general purposes seaplane.

SPECIFICATION.

Maximum speed at 5,000 ft. 140 m.p.h., Landing speed 56 m.p.h. Service ceiling 20,600 ft., Normal range 530 miles, Range with extra tankage 660 miles, Disposable load (fuel, oil, and military load) 2,120 lbs., Weight loaded (General Purposes machine) 5,400 lbs., Climb to 5,000 ft. 4.3 mins., Climb to 10,000 ft. 9.5 mins.

**Le Westland Wapiti.**

Le principal modèle militaire achevé par la société Westland est le Wapiti, biplan biplace de servitude.

Cet avion a été établi pour répondre à une demande de l'Air Ministry d'un appareil adaptable aux missions de bombardement, reconnaissance, photographie, etc. A cause de sa performance remarquable il a été adopté par la Royal Air Force, la Royal Australian Air Force, et la South African Air Force comme appareil de servitude.

Le dernier exemple de ce type, le Wapiti Mk. V, est un avion de co-opération militaire. Normalement, il est muni d'un moteur Bristol Jupiter VIII F, en étoile et refroidi par l'air, mais il peut être équipé de tous moteurs de pareille puissance, refroidis par l'eau ou par l'air.

Le Wapiti V est un biplan intégralement métallique, biplace, et à deux travées, surtout adapté pour la co-opération militaire, mais utilisable pour la reconnaissance, le bombardement, la photographie, la patrouille du désert à long rayon d'action, et l'entraînement supérieur.

Le fuselage est plus long que celui de son prédécesseur, et offre, par conséquent, des avantages où il y a lieu de varier le poids porté dans le poste en arrière.

Le train d'atterrissage, étudié de nouveau, comporte des roues à freins effectifs, et une roue à la queue rend l'appareil très maniable sur terre.

Ainsi qu'avec le premier modèle, le Wapiti peut transporter une surcharge de 272 kg. (600 lb.) dont le poids total peut être aménagé dans le fuselage. L'équipement supplémentaire chargé ainsi comporte un deuxième réservoir d'essence et le combustible, une roue et béquille de réserve, une boite à outils, pièces de rechange, rations, eau, literie et effets personnels de l'équipage, etc. Il y a aussi un dispositif d'accroche-dépêche en dessous du fuselage, et une amélioration de l'ouverture de visée du bombardier dans le plancher lui permet une grande précision dans le tir. D'autres progrès comportent un poste élargi de T.S.F., un pare-brise rabattable pour l'observateur, et un dispositif permettant son parachute à sac d'être disponible immédiatement.

L'armement se compose de deux mitrailleuses, l'une fixe, modèle Vickers, tirant en avant à travers l'hélice, et l'autre, modèle Lewis, montée sur une tourelle du poste à l'arrière. Le chargement maximum de bombes est de 263 kg., (580 lb.) et une position étendue pour le bombardier est aménagée sous le poste du pilote, avec tous les instruments nécessaires. L'appareil photographique est logé dans le premier cloison après le poste à l'arrière et l'équipement comporte tout le materiel utile dans ce travail. Il y a, en outre, un appareil de T.S.F., et inhalateurs d'oxygène, etc.

Le train d'atterissage peut être remplacé par un atterrisseur à deux longs flotteurs à redan, transformant l'appareil en hydravion de servitude très efficace.

CARACTERISTIQUES.

Vitesse maxima à 1,525 m. 225 k.p.h., Vitesse d'atterrissage 90 k.p.h., Plafond 5,300 m., Rayon normal 852 km., Rayon avec réservoir supplémentaire 1,060 km., Charge disponible: essence, huile, et chargement militaire, 962 kg., Poids chargé (avion de servitude) 2,450 kg., Montée à 1,525 m. 4.3 mins., Montée à 3,050 m. 9.5 mins.

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# THE COMPER AIRCRAFT CO., LTD.

## HEAD OFFICE AND WORKS: HOOTON PARK, CHESHIRE.

Three interesting examples of a new trend in aircraft construction are the three types of the Comper Swift now marketed—the 40 h.p., 50 h.p. and 75 h.p. models, with which speeds ranging from 105 m.p.h. to 145 m.p.h. are obtained.

The 40 h.p. Swift fitted with an A.B.C. engine, is adapted for the owner pilot or for practising aerobatics, as it has a Certificate of Aerobatics for full load. The 50 h.p. Swift, whose power-plant is the Salmson nine-cylinder radial, has been designed either as a fast touring aircraft or for the use of Flying Clubs for solo pupils. The 75 h.p. Swift, equipped with a 75 h.p. Pobjoy engine, is designed for the owner pilot who requires a performance beyond anything available in ordinary aircraft, yet inexpensive to run and maintain and with a remarkably low landing speed.

The 1931 Swift monoplanes incorporate all the latest developments and refinements of modern aircraft. They are high braced monoplanes of extremely robust construction. The wing chord is level with the pilot's eyes, and the fuselage bulkheads, which support the wing, together with the decking, have been so arranged that by a slight inclination of the head the pilot can see right ahead on either side.

The performance of the three types is tabulated below.

Les trois nouveaux types d'aéroplane Comper Swift, constituent d'intéressants exemples des nouvelles tendances qui se manifestent en matière de constructions aéronautiques.

Le 40 h.p. Swift, muni d'un moteur A.B.C., est une machine de choix pour le pilote privé, de même que pour l'exercice d'acrobatie aérienne, car elle est couverte par un certificat de capacité pour acrobatie aérienne sous pleine charge. Le 50 h.p. Swift, équipé d'un moteur Salmson radial à neuf cylindres, a été étudié tant comme avion de tourisme à grande vitesse que pour l'usage de clubs d'aviation le 75 h.p. Swift muni d'un moteur Pobjoy de 75 h.p., est étudié pour l'usage du pilote privé qui désire une performance hors concours sans frais d'entretien excessifs, et possédant, en outre, une vitesse d'atterrissage très réduit.

Les monoplans Swift 1931 ont été conçus suivant les données de perfectionnement et de raffinement, les plus modernes. Ils sont des monoplans à ailes surélevées de construction très robuste. La corde de l'aile est au niveau des yeux du pilote, et les cloisons du fuselage portant les ailes de même que l'entoilage sont agencés de manière qu'il suffit au pilote d'incliner légèrement la tête pour étendre son rayon visuel des deux côtes à l'avant.

Les performances sont comme suit:—

| | 40 h.p. Swift. | 50 h.p. Swift. | 75 h.p. Swift. | |
|---|---|---|---|---|
| Speed, max. ... | 105 m.p.h. (168 km.p.h.) | 115 m.p.h. (184 km.p.h.) | 145 m.p.h. (232 km.p.h.) | Vitesse, max. |
| Cruising speed | 85-90 m.p.h. (136-144 km.p.h.) | 100 m.p.h. (160 km.p.h.) | 120 m.p.h. (192 km.p.h.) | Vitesse de croisière |
| Landing speed... | 35 m.p.h. (56 km.p.h.) | 40 m.p.h. (64 km.p.h.) | 40 m.p.h. (64 km.p.h.) | Vitesse d'atterrissage |
| Range ... | 360 miles. (576 kms.) | 300 miles (480 kms.) | 360 miles. (576 kms.) | Rayon d'action |

# BRITISH SALMSON AERO ENGINES, LTD.

## HEAD OFFICE AND WORKS: NEW MALDEN, SURREY.

The range of British Salmson engines comprises a group of air-cooled radials ranging in power from 50 h.p. to 135 h.p., but having as common characteristics reliability, low weight, and smooth vibrationless running.

The A.D. 9 type, which develops 50 h.p. at 2,000 r.p.m., is in a class by itself. Although its total weight with two magnetos is only 154 lb. (69 kgs.) and its total capacity 2,979 c.c., it has nine cylinders. The result is an engine which for smoothness and silence is quite unapproached by any engine of similar power.

During the five years in which this engine has been in general use many notable long distance flights and several world's records have been made by light aeroplanes fitted with the A.D.9.

The A.C.7 is a robust air-cooled radial which is excellently suited for two or three seat light aeroplanes or for larger multi-engined aircraft. In spite of the robustness of the general construction the total weight comes out at no more than 286 lb. (130 kgs.). There are seven cylinders and a feature of the design is that the engine may be used either as a pusher or a tractor—a point of value in connection with multi-cylinder installations, particularly on flying-boats.

The maximum h.p. is developed at 1,800 r.p.m. The seven cylinders and carefully balanced crankshafts ensure smooth running, and the all-round reliability of this type has been proved in lengthy service.

The A.C.9 engine, which completes the British Salmson range develops 135 h.p. at 1,800 r.p.m. with a total weight of 374 lb. (170 kgs.). Like the A.C.7 it is adaptable either to a pusher or a tractor installation and in fact is suitable for all purposes where more power is needed than is furnished by the A.C.7.

There is a large degree of inter-changeability between this model and the A.C.7.

In spite of the refinements embodied in these engines, the up-to-date factory organisation of British Salmson Aero Engines Ltd. enables them to be produced at a competitive price. The high standard of material and inspection which have made British Aero Engines famous are more than maintained in the British Salmson range.

La gamme des moteurs Salmson de construction anglaise embrasse un groupe de moteurs en étoile à refroidissement par air de puissances s'échelonnant depuis 50 CV jusqu'à 135 CV et présentant tous comme caractéristiques communes sûreté de fonctionnement, légèreté et marche douce sans vibrations.

Le type A.D.9 qui développe 50 CV à 2,000 t/m. forme classe à part. Bien que son poids total avec deux magnétos ne soit que de 69 kg. et sa cylindrée totale de 2,979 c.c., il a neuf cylindres. Par suite ce moteur, comme douceur et silence de fonctionnement, n'a pas de rival parmi les autres moteurs de même puissance.

Depuis cinq ans que ce moteur est en usage général nombre de vols notables de long rayon ont été accomplis et plusieurs records mondiaux établis par des avions légers munis du moteur A.D.9.

Le type A.C.7 est un robuste moteur en étoile refroidi par l'air qui convient à merveille pour avions légers biplaces ou triplaces ou pour plus grands appareils à plusieurs moteurs. Malgré la robustesse générale de sa construction son poids total ne dépasse pas 130 kg. Il a sept cylindres et présente cette particularité de pouvoir être employé comme propulseur ou comme tracteur—avantage précieux à bord d'appareils multimoteurs et particulièrement d'hydravions.

La puissance maximum est développée à 1,800 t/m. Les sept cylindres et le vilebrequin soigneusement équilibré assurent une marche très douce; quant à la sûreté générale de ce type, elle a été prouvée en service de longue durée.

Le moteur A.C.9 qui complète la série des moteurs anglais Salmson développe 135 CV à 1,800 t/m. Son poids total est de 170 kg. Comme le modèle A.C.7 il peut être utilisé soit comme propulseur soit comme tracteur, et convient, en fait, pour toutes les affectations exigeant une plus grande puissance que celle du modèle A.C.7.

Il existe un degré considérable d'interchangeabilité entre les organes de ce moteur et ceux du modèle A.C.7.

Malgré les raffinements que présentent ces moteurs, l'organisation toute moderne des usines de la société British Salmson Aero Engines Ltd. lui permet de les produire à des prix qui ne craignent pas la concurrence. L'excellence de matériaux et la rigueur de contrôle qui ont fait la renommée des moteurs anglais d'aviation sont plus que maintenues dans toute la gamme des moteurs anglais Salmson.

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# S. G. BROWN, LTD.

## HEAD OFFICE AND WORKS: WESTERN AVENUE, NORTH ACTON, LONDON, W.3.

S. G. Brown have achieved an international name for themselves as manufacturers of a gyroscopic compass which has been of considerable value in marine navigation. There is interest in noting that Brown gyroscopic compasses are widely used in the French Navy and Mercantile Marine.

With all this long experience of gyroscopes behind them it is not surprising to learn that the British Air Ministry approached the firm to find whether they could produce a Turn Indicator which should be electrically driven but which would have no effect upon the compass. This delicate problem called for all the ingenuity that the firm could bring to bear upon the problem, but they successfully solved it.

To-day they have put on the market a Turn Indicator which weighs only 1 lb. 7 ozs. and measures 4 in. in the three dimensions. It consumes only .5 amperes at 12 volts and has no effect whatever upon the compass. This latter feature is particularly important as although venturi-driven Turn Indicators are satisfactory there is always the chance that snow or ice will interfere with the source of power.

The Brown electrically-driven Turn Indicator has two controls, one for turning it on and off and the other for controlling the sensitivity of the instrument, so that it can be fitted on machines of all classes. A turn of a knurled knob sets the instrument for the lively manœuvres of the single-seat fighter of the more sober motions of the big bomber.

Recent research has shown how much can be accomplished by the aid of a reliable Turn Indicator. Flying in fog and cloud becomes less risky when the pilot receives instant warning of his deviation from the straight flight path. This instrument is particularly applicable to the single-seat fighting aircraft and to other machines of similar type.

Visitors to the Paris Aero Show will have an opportunity of seeing this instrument as one will be fitted in the cockpit of the Armstrong Whitworth Atlas Army Co-operation machine, and another in the D.H. Puss Moth. This will give those who are interested an opportunity of seeing how small a space this valuable instrument takes.

The Brown Turn Indicator is of course particularly suitable for the private owner. For the individual who does not wish to incur quite the cost of the electrically-driven instrument there is the air-driven model which is considerably cheaper than the electrically-driven type.

Some valuable experiments in fog-landing were made in England during last summer and a standard Avro with a Lynx engine was landed five consecutive times with a similar number of take-offs through a belt of fog 90 ft. deep. As far as one knows this was the first occasion on which landings and take-offs have been effected purposely through fog.

Only two instruments additional to the usual range of aircraft instruments were used, one was a ground proximeter which is a simple instrument for telling the pilot when he had got within 14 ft. of the ground. The other was a Pitch-and-Yaw indicator. This new instrument is also made by S. G. Brown Ltd.

The Pitch-and-Yaw indicator shows the pilot whether the nose of the machine is rising or falling from the set attitude of pitch, and also whether the machine is yawing to one side or another of the pre-arranged flight path. It is a gyroscopic instrument and electrically-driven.

The indicating mechanism is simple. A spot of light is eclipsed behind a black spot in the middle of the indicator face when the machine is flying on a level keel and not yawing. So soon as the machine yaws, or alters its attitude in pitch the white spot appears to one side of, or above the black spot. Thus to fly on a level keel and without yawing the pilot merely has to keep the white spot behind the black.

The instrument can also be used for a steady glide by moving the whole instrument through the requisite number of degrees. The pilot by keeping the white spot behind the black then keeps the machine in a steady glide. The procedure could be altered for a steady climb.

This instrument is intended for special requirements but like the Turn Indicator is quite small and does not take up a lot of room.

These two instruments are perhaps the most interesting made by S. G. Brown Ltd., but they are not the only aircraft equipment produced by the firm, who are devoting their extremely specialised knowledge to the solving of the problems which still beset aerial navigation.

S. G. Brown s'est acquis une renomée internationale comme fabricant d'une boussole gyroscopique qui rend les plus grand services dans la navigation maritime. Il est intéressant de noter en passant que les compas gyroscopiques Brown sont très employés dans la marine française de guerre et de commerce.

Etant donnée toute cette longue expérience de la maison dans la construction d'appareils gyroscopiques, on n'est pas surpris d'apprendre que le Ministère de l'Air britannique lui a demandé si elle ne pourrait pas construire un indicateur de virage actionné à l'électricité qui n'aurai aucune action sur la boussole. Ce délicat problème demandait toute l'ingéniosité que la maison pouvait y apporter, mais elle réussit à le résoudre.

Elle a mis aujourd'hui sur le marché un indicateur de virage qui ne pèse que 652 grammes et ne mesure que 102 millimètres dans ses trois dimensions. Il ne consomme que 0.5 ampère à 12 volts et n'a aucune action sur la boussole. Ce dernier point est particulièrement important, car bien que les indicateurs de virage à commande Venturi soient satisfaisants, il est toujours à craindre que la niege ou la glace n'obstruent la source de force motrice.

L'indicateur de virage Brown à commande électrique comporte deux manettes de commande: l'une sert à le mettre en circuit ou hors circuit, et l'autre à régler la sensibilité de l'instrument pour permettre de l'installer sur des appareils de toutes catégories. Un tour du bouton molette met l'instrument au point pour les actives manœuvres du monoplace de combat ou pour les plus sobres mouvements du gros avion de bombardement.

Des recherches récentes ont montré tout ce qui peut s'accomplir avec l'aide d'un indicateur de virage sûr. Le vol dans le brouillard ou les nuages s'accompagne de moins de risques lorsque le pilote est averti de suite de toute déviation hors du vol rectiligne. Cet instrument convient particulièrement pour les avions de combat monoplaces, et autres appareils analogues.

Le visiteurs du Salon Aéronautique de Paris auront l'occasion de voir cet instrument, dont un exemplaire sera installé dans le poste de l'appareil de coordination militaire Armstrong Whitworth Atlas, et un autre dans le D.H. Puss Moth. Les intéressés pourront se rendre compte du peu d'encombrement de ce précieux instrument.

L'indicateur de virage Brown est, on le conçoit, particulièrement utile au propriétaire privé d'avion. Pour celui qui ne désire pas faire les frais d'un instrument à commande électrique, il y a le modèle à commande aérodynamique, qui est bien meilleur marché.

On fit en Angleterre l'été dernier des expériences d'un haut intérêt sur l'atterrissage dans le brouillard: un avion normal Avro à moteur Lynx atterrit cinq fois de suite après le même nombre d'envols au travers d'une zone de brouillard de 90 pieds d'épaisseur. A notre connaissance c'était la première fois qu'un avion s'envolait et atterissait délibérément dans le brouillard.

Il n'y avait à bord que deux instruments en plus de l'équipement ordinaire des avions: l'un était un proximètre, qui est un simple instrument pour avertir le pilote lorsqu'il est à 4 mètres du sol; l'autre était un indicateur de tangage et de lacet, instrument nouveau construit également par S. G. Brown Ltd.

L'indicateur de tangage et de lacet indique au pilote si l'avant de l'appareil s'éléve ou s'abaisse hors de l'inclinaison qui lui a été donnée, et si l'appareil dévie d'un côté ou de l'autre de sa trajectoire prédéterminée. C'est aussi un instrument gyroscopique à commande électrique.

Le mécanisme indicateur est fort simple: un point lumineux est éclipsé derrière un point noir placé au milieu du cadran de l'indicateur lorsque l'avion vole horizontalement sans aucune déviation latérale. Dès que l'avion dévie ou change d'inclinaison le point lumineux apparait à côté ou au-dessus du point noir. Ainsi pour voler horizontalement et sans dévier le pilote n'a qu'à maintenir le point lumineux derrière le point noir.

L'instrument peut être utilisé aussi pour le vol plané soutenu si on le déplace du nombre voulu de degrés. En faisant rester le point lumineux derrière le point noir le pilote maintient son appareil en vol plané soutenu. Il pourrait de même le maintenir en ascension continue par un déplacement inverse de l'instrument.

Cet instrument est destiné à répondre à certaines exigences spéciales, mais, comme l'indicateur de virage, il est très petit et peu encombrant.

Ces deux instruments sont peut-être les plus intéressants que fabrique S. G. Brown Ltd., mais ce ne sont pas les seules parties de l'équipment des avions que produise la maison; celle-ci consacre en effet ses connaissances extrêment spécialisées à la solution des problèmes qui obsèdent encore la navigation aérienne.

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# CELLON, LTD.

## HEAD OFFICE AND WORKS: UPPER HAM ROAD, KINGSTON-ON-THAMES.

The British firm of Cellon Ltd. have been making dope continuously since 1911 when the company was formed. In 1912 THE AEROPLANE contained a reference to the excellence of the dope made by this firm and speaking of Mr. S. F. Cody's machine said that the dope stood up magnificently to the strains set up by speeds of 70 to 75 m.p.h.

Now the firm produces dope which successfully withstands the strains set up by speeds five times as great. Cellon dopes were used on the Gloster and Supermarine machines which were entered by Great Britain for the Schneider Trophy Contest for 1929. In this connection one recalls that the first British victory in this Contest was won in 1914 by Mr. Howard Pixton on a Sopwith seaplane which was doped with Cellon.

During the war period the demand for Cellon was enormous and it was produced in very large quantities in their big Richmond Works. After the war the firm realised that a cellulose lacquer would offer many advantages for motor coach-work so they started to pioneer in this application of their products. To-day Cerric Lacquers for this and many other purposes are World-famous.

The change over from the use of wood to the use of metal in the construction of aeroplanes has made bigger demands than ever upon the resources of Cellon Ltd. for metal structures need a protective covering. The firm specialises in the production of materials for this purpose.

They produce cellulose acetate and cellulose nitrate dopes as required and these can be supplied pigmented to whatever colour is wanted.

The firm has recently found it necessary to acquire new works and have built a new factory at Kingston.

An important, and perhaps from one point of view the most important, part of the works is the very fine laboratory. Here close check is kept to ensure the high degree of purity required for the incoming raw materials and throughout the manufacturing processes it keeps a careful watch on the products to see that they are up to that high standard which has made the name of Cellon famous all over the World.

La Maison anglaise Cellon Ltd. s'est occupée de la fabrication de vernis pour aéroplanes sans intermission, depuis 1911, année de sa fondation. Dès 1912 la revue THE AEROPLANE publiait un article des plus élogieux sur les hautes qualités des vernis fabriqués par cette maison; faisant allusion à la machine de M. S. F. Cody, elle rapportait que ces vernis purent résister, sans révéler la moindre faiblesse, aux efforts engendrés par des vitesses de 112 à 120 kilomètres à l'heure. Depuis cette époque la Maison Cellon a produit des vernis capables de résister tout aussi victorieusement à des vitesses équivalent au quintuple, car ils furent appliqués aux machines Gloster et Supermarine employées par l'équipe anglaise qui prit part à la Coupe Schneider en 1929. Il ne sera pas hors de propos de rappeler, à ce sujet, que le premier anglais à remporter la victoire dans cette classique épreuve fut M. Howard Pixton, sur hydravion Sopwith verni au Cellon.

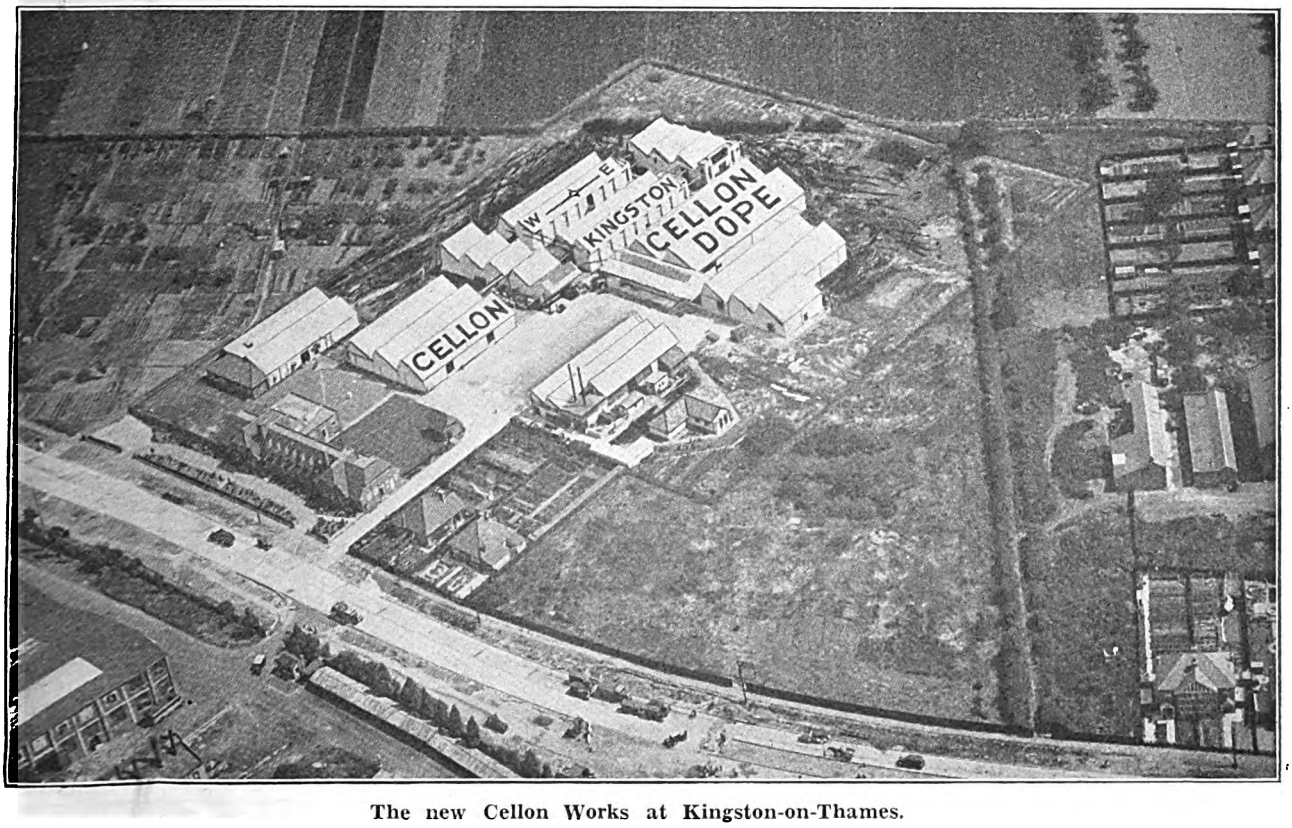
Pendant la récente période d'hostilités les Etablissements Cellon eurent à faire face à une énorme demande pour leur produit, dont de très considérables quantités furent fournies par leurs grandes usines de Richmond. Après la guerre, la Maison Cellon, se rendant compte des considérables avantages que l'industrie de la carrosserie pour automobiles retirerait de l'emploi d'une laque à la cellulose, s'est attelée à la tâche d'innover cette application de ses produits. Les laques "Cerric" se sont désormais acquis une réputation mondiale, tant pour cette application que pour bien d'autres.

La transition de l'emploi de bois à celui de métaux dans la construction d'aéronefs n'a pas manqué d'imposer de nouveaux efforts, exigeant le déploiement de toutes les ressources des Etablissements Cellon Ltd., car les structures métalliques ne peuvent se passer d'enduits protecteurs. La Maison Cellon se spécialise dans la production de matériaux affectés à ces usages.

Elle produit des enduits et vernis à l'acétate et au nitrate de cellulose, conformes à toutes les exigences, livrables avec addition de colorants fournissant toutes les nuances requises.

La Maison Cellon, ayant à étendre ses installations, s'est récemment vue obligée de se construire une nouvelle usine à Kingston.

Il nous reste à dire un mot du magnifique laboratoire qui constitue, sans doute, à certains points de vue, la partie vitale de l'établissement, et où un personnel spécialisé exerce sans cesse la plus étroite des surveillances sur la production de l'usine, dans le but d'en maintenir, grâce à la pureté des matières premières employées, contrôlée sans relâche à son tour, à toutes les phases de la fabrication, le haut degré d'excellence qui a fait la réputation de la marque "Cellon" dans toutes les parties du globe.




The new Cellon Works at Kingston-on-Thames.

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# THE ENGLISH STEEL CORPORATION LTD.

## HEAD OFFICE: VICKERS WORKS, SHEFFIELD.

### Special Steels and Finished Products for Aircraft.

The continuous progress of aircraft design would have been impossible without the development by the steel manufacturer of special high-service steels.

In this development the firms Vickers Ltd., Armstrong Whitworth and Co. Ltd. and Cammell Laird and Co. Ltd. have all played a prominent part. They are now incorporated under the title of the English Steel Corporation Ltd., and thus an aggregation of equipment and skill has been concentrated on a scale and under conditions which will secure the greatest possible economies in manufacture and the highest quality of products.

Each separate component works has in the past had its own research laboratories, and the knowledge and equipment of these separate units are now pooled and devoted to the service of the English Steel Corporation.

The Metallurgical and Research Laboratories at the Vickers Works have recently been rebuilt and reorganised, so that now their equipment and personnel compare favourably with that of any similar laboratory in the world.

Research, both in the laboratory and the works; a rigid inspection of parts at every phase of manufacture and searching tests on the finished product, together with an experience of special steels for aviation purposes dating from the birth of aviation; all these factors enable the English Steel Corporation to maintain the continuous development of steels and steel components, which is placed by them at the service of the aircraft designer.

Amongst some of the more important products of this vast concern are crankshafts and airscrew shafts, which are drop-forged from a medium nickel chrome molybdenum steel, known as Super V.N.C.A.; and airscrew hubs and flanges, and connecting-rods from a 65-ton Tensile nickel chrome steel, which fulfil the British Air Board Specification S70.

A typical set of tests on an E.S.C. crankshaft and the positions from which the various tests are taken are indicated in Fig. 1 and in the table which accompanies it.

Important products made of non-ferrous alloys include crank-cases drop-forged from Vickers Duralumin, and cylinder heads from "Y" alloy.

### Aciers Spéciaux et Produits Finis pour Avions.

Le progrès continu de la construction d'avions aurait été impossible sans le développement d'aciers spéciaux par les fabriquants d'acier.

Dans ce développement, les sociétés Vickers, Armstrong Whitworth et Cammel Laird ont toutes joué un rôle important. Elles sont maintenant incorporées sous l'appellation English Steel Corporation Ltd. Ainsi il s'y trouve concentré un rassemblement d'équipement et d'habileté d'une si grande échelle et sous de telles conditions que les plus grandes économies possibles et la meilleure qualité des produits reste assurée.

Chaque atelier séparé avait dans le passé ses laboratoires de recherche particulieres. L'expérience et l'équipement de ces unités séparées sont maintenant réunies et se dévouent au service de l'English Steel Corporation.

Les laboratoires métallurgiques et de recherche des ateliers Vickers ont été récemment reconstruits et réorganisés, de sorte que ces laboratoires et leur personnel comparent favorablement à tout autre semblable au monde.

La recherche, soit au laboratoire ou à l'atelier, une inspection rigide des pièces à chaque procédé de fabrication, et des essais minutieux du produit fini, accompagnés d'une expérience d'aciers spéciaux pour avions datant de la naissance de l'aviation, tous ces facteurs permettent à l'English Steel Corporation de maintenir le développement continu d'aciers et de ses constituants, qu'ils mettent à la disposition des constructeurs d'avions.

Parmi quelques produits des plus importants de cette vaste organisation sont les vilebrequins et les arbres d'hélices, en acier moyen chrome-molybdène matricé, et connu sous la classification Super V.N.C.A., et les moyeux d'hélices et leurs collets fabriques d'acier nickel-chrome de sollicitation 65 tonnes, exécutant le devis S.70 du British Air Board.

Un assortiment représentatif d'essais sur un vilebrequin E.S.C., et les positions d'où les épreuves différentes sont faites sont indiqués dans Fig. 1 et dans le tableau reproduit sur nos pages.

Dans les importants produits en alliages non-ferreux on remarque les carters de vilebrequins en duralumin Vickers matricé, et des fonds de cylindres en alliage "Y."

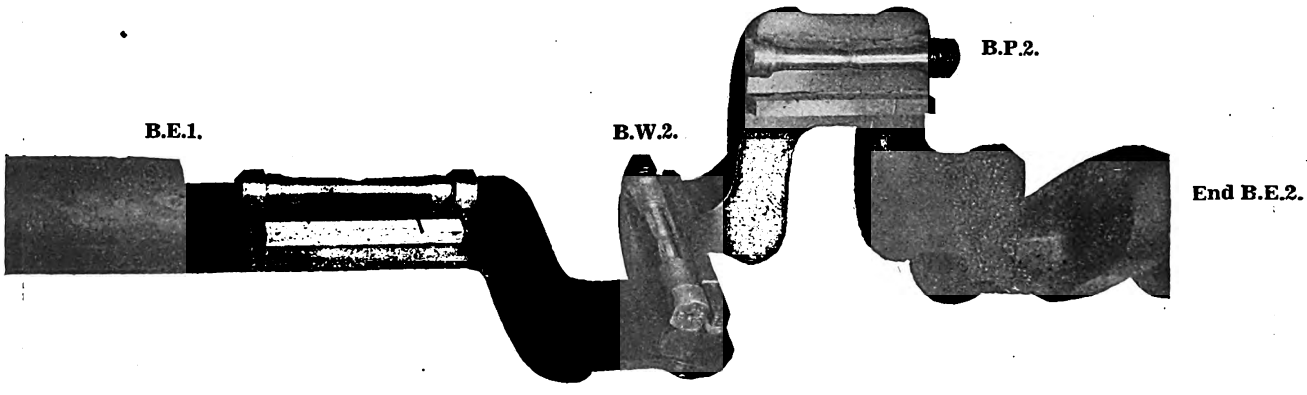


FIG. 1.

| | B.E.1 | B.W.2 | B.P.2 | B.E.2 | B.E.1 | B.W.2 | B P.2 | B.E.2 | |
|---|---|---|---|---|---|---|---|---|---|
| Yield point ... | 38·5 tons per sq.in. | 60·4 tons per sq.in. | 58·5 tons per sq. in. | 58·5 tons per sq.in. | 92·1 kg. per sq.mm | 95·1 g. per sq.mm | 92·1 kg. per sq.mm | 92·1 kg. per sq.mm | Limite apparente d'élasticité |
| Maximum stress ... | 66·4 tons per sq.in. | 68·2 tons per sq.in. | 66·0 tons per sq.in. | 66·2 tons per sq.in. | 104·6 kg. per sq.mm | 107·4 kg. per sq.mm | 104·0 kg. per sq.mm | 104·3 kg. per sq.mm | Force de rupture |
| Elongation % ... | 19·0% on 2 ins. | 17·3% on 1·5 ins. | 17·5% on 2 ins. | 19·0% on 2 ins. | 19% on 50·8 mm | 17·3% on 38·1 mm | 17·5% on 50·8 mm | 19·0% on 50·8 mm | Allongement % |
| Reduction of area | 54·6% | 58·0% | 52·2% | 54·6% | 54·6% | 58·0% | 52·2% | 54·6% | Réduction de surface |
| Izod impact test ... | 70 & 63 ft. lbs. | 48 & 56½ ft. lbs. | 57 & 51 ft. lbs. | 49½ & 49 ft. lbs. | 9·68 8·71 kg. mm | 6·64 & 7·81 kg. mm | 7·88 & 7·05 kg. mm | 6·84 & 6·77 kg. mm | Essai de choc Izod |
| Brinell hardness... | 302 | 305 | 302 | 302 | 302 | 305 | 302 | 302 | Essai scléroscopique Brinel |

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Tubes are an important constituent part of all-metal aircraft, and in 1913 a special tube mill for dealing with high quality high-tensile tubes was put down.

The question of corrosion, more particularly in sea-going aeroplanes, has received constant attention, and stainless steels, both the pearlitic and austentic types, are supplied for the manufacture of special fittings for spar and rib construction, for parts of the engine and for the manufacture of wire rope.

Special heat-resisting steel is drop-forged for the manufacture of exhaust valves, or it may be rolled into sheet for exhaust manifolds.

The crankshaft is one of the most important component parts of an aero-engine, and the English Steel Corporation have for many years specialised in the manufacture of crank shafts. The desideratum is high-tensile strength and a high fatigue limit combined with the maximum amount of toughness. In addition to these properties, absolute "cleanliness" of the steel is essential.

Intensive research into the nature and genesis of non-metallic impurities has enabled the English Steel Corporation not only to keep these at a minimum, but also to predict with tolerable certainty the position of these impurities in the ingot, and to ensure that during the process of manufacture all the impure portions of the ingot are discarded.

Small-scale tests in the laboratory, followed by large-scale tests in the works, which include the sectioning and etching of the finished product, have assured that the "grain flow" is ideal for giving maximum toughness. Fig. 2 shows a nature print taken from an etched half-section of a crankshaft made by the English Steel Corporation. The unbroken flow lines show that there is no weakening of the material by incorrect forging due to faulty die design.

Frequent inspection by expert technicians at each stage in the manufacture makes it impossible for any part to pass to the next stage if it is in the slightest degree faulty, and the final heat-treatment is done at such rates of heating, and under such close pyrometric control, that the finished product is free from dangerous internal stresses, but still possesses the highest combination of fatigue limit and toughness.

This manufacturing policy has been attended with such a measure of success that all types of crankshafts for British Service aircraft and for many important private aircraft constructors, both in England and on the Continent, are manufactured by the English Steel Corporation.

Almost all of the record-making flights, including each winning of the Schneider Trophy Contest by a British machine, have been made with engines fitted with English Steel Corporation crankshafts.

Aircraft constructors may, therefore, with every confidence entrust the manufacture of aircraft parts to the English Steel Corporation, knowing that their huge experience and their excellent record of work done will be a guarantee of satisfaction. Their up-to-date plant and equipment, under the control of highly-specialised experts, ensures that the work will be done both economically and efficiently.

Les tubes forment une partie importante des avions entièrement metalliques, et en 1913 on érigea un moulin tubulaire spécial pour tubes de haute résistance de la meilleure qualité.

La question de corrosion, plus spécialement pour les avions marins, a reçu une attention incessante, et l'acier inoxydable, soit perlite soit austentique, est fabriqué pour les éléments spéciaux dans la construction des longerons et des membrures, pour des parties de moteur et pour la fabrication des cables métalliques.

Un acier spécialement résistant à la chaleur est matricé pour la fabrication des soupapes d'échappement, ou est laminé en tôle pour les tubulures d'échappement.

Le vilebrequin est un des plus importants constituants d'un moteur d'avion et l'English Steel Corporation a spécialisé pendant plusieurs années dans leurs construction. Les désidérata sont une haute résistance à la traction et une haute limite de fatigue, avec le maximum de tenacité. Il est essentiel d'ajouter à ces qualités une propreté absolue de l'acier.

Une recherche minutieuse dans la nature et l'origine des impuretés non-métalliques a permis à l'English Steel Corporation non seulement de les réduire au minimum mais aussi de prédire avec une certitude tolérable la position de ces impuretés dans le lingot et d'assurer que pendant le procédé de fabrication toutes les parties impures du lingot soient rejetées.

Les essais en échelle réduit dans le laboratoire, suivis d'essais naturels dans les ateliers, comprenant la section et les épreuves à l'eau forte, assurent que la coulure du grain soit idéal pour donner le maximum de tenacité. La Fig. 2 reproduit une impression naturelle d'une épreuve à l'eau forte d'une demi-section d'un vilebrequin fabriqué par l'English Steel Corporation. Les lignes non interrompues de la coulure montre qu'il n'y a aucun affaiblissement de la matière résultant d'un forgeage incorrect produit par une matrice mal construite.

L'inspection fréquente, par des techniciens experts, à chaque étape rend impossible à aucune pièce de passer au procédé suivant si elle est du tout fautive, et le traitement thermique final est appliqué sous de tels degrés de chauffage et sous un controle pyrométrique tellement étroit, que le produit fini ne contient aucune sollicitation internale, tout en retenant la plus grande combinaison de limite de fatigue et de tenacité.

Ce système de fabrication a obtenu un si grand succès que toutes classes de vilebrequins pour les avions militaires anglais et pour beaucoup de constructeurs privés, tant en Angleterre qu'à l'Etranger, sont fabriques.

Presque tous les vols de record, entre autres le concours pour la Coupe Schneider, gagné par l'Angleterre, furent accomplis avec des moteurs à vilebrequins fabriqués par l'English Steel Corporation.

Les constructeurs d'avions peuvent donc, avec toute assurance, confier la fabrication de pièces pour avions à l'English Steel Corporation, sachant que leur vaste expérience et leur record excellent de travail accompli leur sera une garantie de satisfaction. Leurs outillages et équipement modernes, contrôlés par des experts spécialistes sont des garantis que l'entreprise sera achevée avec la plus grande économie et efficacité.

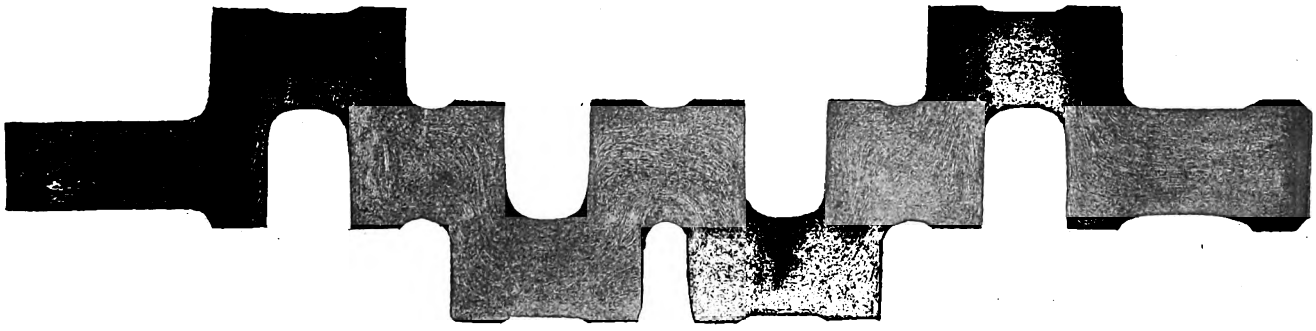

FIG. 2.

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# HIGH DUTY ALLOYS LTD.

**HEAD OFFICE AND WORKS:—81, BUCKINGHAM AVENUE, TRADING ESTATE, SLOUGH, BUCKS.**

One of the most striking aspects of the aircraft industry in Great Britain is the way in which raw materials have been developed to fulfil the exacting needs of the aircraft engineer. In no case is this more marked than in that of the alloys of aluminium, the high strength-weight ratio of which has done so much to make modern aviation possible.

The development of the modern aero-engine has made necessary the development of light alloys with special features for withstanding the enormous stresses that are engendered within the engine. Perhaps the most interesting engine of its type in the World to-day is the Rolls-Royce "R" engine which holds the World's Speed Record. This engine has crank-case, cylinder-block and cylinder-heads as well as other castings in R.R. "Hiduminium" Alloy.

This alloy has been patented by Rolls-Royce Ltd. and much development work relating to it was done by High Duty Alloys Ltd., Slough, who own the sole manufacturing rights. The French licensees for these alloys and for the processes of High Duty Alloys Ltd. in general are the Société Anonyme Fonderies Debard, 89, Rue Oberkampf, Paris.

The composition of the R.R. "Hiduminium" Alloy, which varies between wide limits, is as follows:—

Copper—.5 to 5 per cent.
Nickel—.2 to 1.5 per cent.
Magnesium—.1 to 5 per cent.
Iron—.6 to 1.5 per cent.
Titanium—Up to .5 per cent.
Silicon—.2 to 5 per cent.
Aluminium—Remainder.

Although this alloy is not the sole concern of High Duty Alloys Ltd. whose big works have a tremendous output of high-class light alloys of various kinds, yet this new and extremely important alloy is perhaps the most interesting of their products.

Their works have been very carefully organised to deal with these products and their methods of manufacture have been described as being those of the laboratory commercialised. In so far as attention is concentrated on quality rather than quantity this is probably true. The foundries and shops are all under laboratory control.

Ingots that are intended for forging receive very careful treatment Each size of ingot has its own particular rate of cooling. If this is too fast or too slow the ingot is spoilt. A large clock is mounted at the casting station and indicates, rather like a stop-watch, in half seconds, so that a fine control is available.

This close attention to detail is a characteristic of the whole organisation which takes every precaution to ensure the very highest quality of its products. So up-to-date are these precautions that not only are all the usual and special laboratory tests used as well as the very finest testing machinery, but High Duty Alloys Ltd. have now a skilled radiographer as a special member of their staff. He has been doing a lot of work to determine the feasibility of using X-Rays to find hidden flaws within the material which otherwise would never be found until they caused the failure of a part.

Although this new department is only in the experimental stages much valuable information has already been gained from the photographs which have been taken and eventually the adoption of this system of examination is not unlikely for certain classes of work.

Un des aspects les plus frappants de l'industrie aéronautique dans la Grande Bretagne est la façon de laquelle les matières premières ont été développées pour répondre aux exigences du constructeur d'aviation. Et ce progrès n'est nulle part plus prononcé que dans les alliages d'aluminium, dont le rapport élevé de résistance au poids a contribué à rendre possible l'aviation moderne.

Le développement du moteur d'aviation moderne a nécessairement conduit à un développement des alliages légers comportant des traits spéciaux pour résister aux forces énormes produites à l'intérieur du moteur. Le moteur sans doute le plus intéressant de son genre au monde à l'heure actuelle doit être le Rolls-Royce "R" détenant le record de vitesse mondial. Ce moteur présente un carter de vilebrequin, bloc de cylindres et culasses ainsi que d'autres pièces en fonte d'alliage R.R. "Hiduminium."

Cet alliage a été breveté par la firme Rolls-Royce Ltd. et beaucoup de travail pour le développer a été effectué par High Duty Alloys Ltd., de Slough, qui possèdent les droits de fabrication exclusifs. Les licenciés français auxquels les droits afférents à ces alliages ainsi qu'à tous les procédés de la High Duty Alloys Ltd. ont été conférés de manière générale est la Société Anonyme des Fonderies Debard, 89, Rue Oberkampf, Paris.

La composition de l'alliage R.R. "Hiduminium" varie entres de larges limites comme suit:—

Cuivre—0.5—5%.
Nickel—0.2—1.5%.
Magnésium—0.1—5%.
Fer—0.6—1.5%.
Titanium—0.—0.5%.
Silicium—0.2—5%.
Aluminium—Le reste.

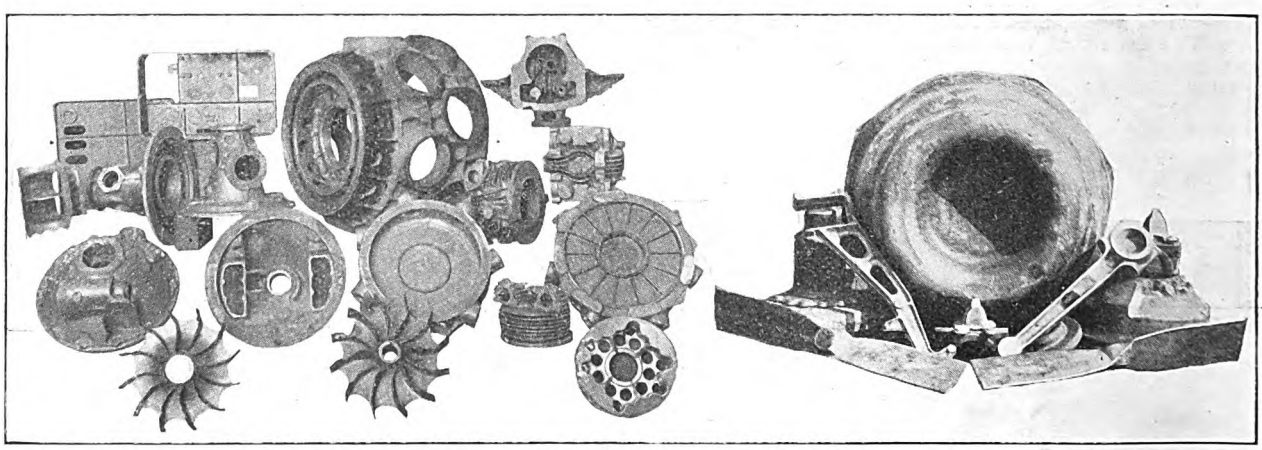
Bien que cet alliage ne soit nullement la seule occupation de High Duty Alloys Ltd. dont les grandes usines ont une production énorme en alliages légers de haute qualité de toutes sortes, cet alliage nouveau et fort important est, peut-être, néanmoins l'article le plus intéressant parmi tous leurs produits.

Leurs ateliers ont été soigneusement organisées pour traiter ces produits et leurs procédés de fabrication ont été appelés ceux du laboratoire commercialisé. Pour autant que tous efforts sont dirigés sur la qualité plutôt que la quantité, ceci est sans doute vrai. Toutes les fonderies et ateliers se trouvent sous le contrôle du laboratoire.

Les lingots destinés à être forgés sont fort soigneusement traités. Chaque dimension de lingot a son délai de refroidissement particulier. S'il est refroidi trop vite ou trop lent, le lingot est abimé. Une grande montre est installée près du poste de coulage indiquant de la manière d'une montre à arrêt les demie-secondes, ainsi permettent une surveillance très exacte.

Ces soins minutieux en tous détails est un trait caractéristique de oute l'organisation, qui prend toutes précautions pour assurer la plus haute qualité dans ses produits.

Cette orientation est moderne à ce point qu'il s'emploit non seulement les essais de laboratoire ordinaires et spéciaux ainsi que les appareils d'essayage les plus délicats, mais en outre la High Duty Alloys Ltd. compte à présent parmi son personnel un spécialiste chargé du service de radiograph. Il a travaillé beaucoup pour examiner la possibilité de faire emploi des rayons X pour retrouver les défauts cachés à l'intérieur du matériel, desquels on ne s'appercevraient autrement pas jusqu'à ce qu'ils avaient conduit à la fracture d'une pièce.



**Various aero-engine castings in Hiduminium Alloy.**

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# LODGE PLUGS, LTD.

## HEAD OFFICE AND WORKS: RUGBY.

While the design of Lodge aviation plugs is conventional, their construction ensures the maximum resistance to both heat and oil, together with ready demountability for clearing and rust-proofing of all steel parts. A feature of the construction is gas-tightness under all temperature changes, ensuring full efficiency for the plug during its whole life. This permanent gas-tightness is obtained by shrinking the steel collar forming the shoulder between the upper and lower sets of mica washers, directly on to the mica wrapping of the central electrode. This gives a gas-tight seal independent of changes of temperature, and obviates that rapid deterioration of the plug for which gas leakage is largely responsible.

Another feature is that the mica used for insulation is treated by a special process, giving such high heat resistance that overheating for a brief period does not cause permanent damage to the insulation. This ability to withstand temporary overheating allows of the engine being over-loaded for short periods (as when taking off and climbing) without fear of damage to the plugs.

The Lodge A.20 plug is suitable for aircraft engines of medium compression but when used in high-compression engines at full load it is liable to over-heat and so cause pre-ignition. To make a plug of this design suitable for high-compression engines it was necessary to find a method of improving the heat factor of the sparking plug and this without detracting from its ability to withstand oil and soot.

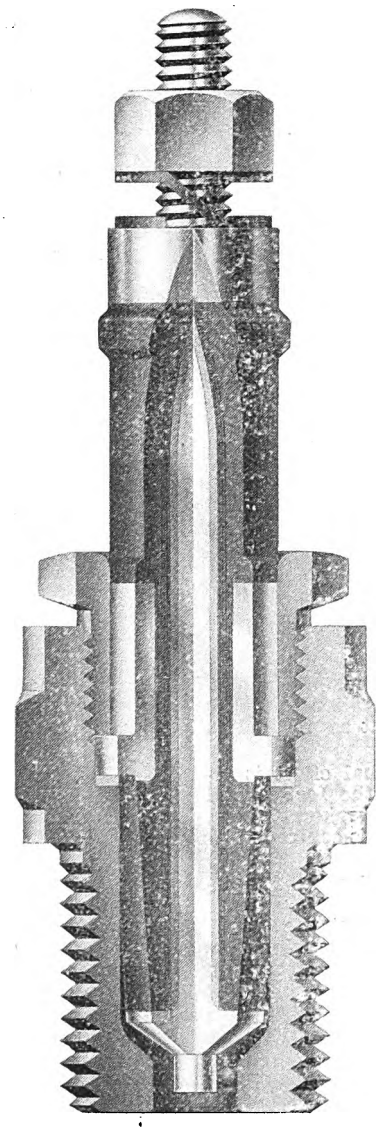
To improve the heat qualities of a plug without reducing its oil-resisting properties it is necessary to increase the heat conduction through the plug. The obvious way to do this is by the use of copper, but the difficulty is to introduce enough copper without materially reducing the insulation or strength of the steel centre pin. Different methods were tried, among others that of fitting a thin copper sleeve between the centre pin and the mica insulation. This method was found to make a surprising improvement. The sparking plug made to this design is classified as Lodge A30. Such plugs have proved suitable for practically all modern high-compression aircraft engines.

With certain engines of exceptionally high output, such as the Rolls-Royce "F" type, it was found that even the Lodge A30 was not quite capable of withstanding the great heat at full load tests, and it was necessary to make the plug capable of withstanding still greater heat. This was effected by inserting a short copper core into the centre pin at the sparking end.

This method of construction adds considerably to the cost of making the plug, but the combined effect of the copper core and the copper sleeve is to render the plug exceptionally good in withstanding very great heat.

Lodge aviation plugs will be exhibited at the Paris Aero Show on the Lodge Stand (No. 7, Gallery "A"). Included will be special models for Gipsy engines and for American engines, and a new series of lightweight high efficiency plugs with short projection to facilitate engine cowling. An interesting exhibit will be one of the actual plugs used in Fl. Lieut. Waghorn's machine with which he won the Schneider Trophy. These plugs were also used in the machine that attained the World's Air Speed Record.

A point of great importance in the care of sparking plugs, and for the benefit of the ignition system generally, is the accurate maintenance of correct plug gaps. To encourage and facilitate this the Lodge Company supplies limit gauges mounted on a neat key-ring, with full instructions in English and several foreign languages. Callers at the Lodge stand at the Paris Show will be given one of these, or one will be sent to any pilot or ground engineer on application to the Company, the address of which is Lodge Plugs Ltd., Rugby, England.



Qoique la construction des bougies aéronautiques Lodge soit conventionnelle, leur construction assure le maximum de résistance à la chaleur et à l'huile, et admet le démontage facile des parties en acier, pour les nettoyer et les protéger contre la rouille. Une caractéristique de sa construction est qu'elle est absolument étanche aux gazes par toutes variations de température, assurant ainsi l'efficacité complète de la bougie pendant toute sa vie. Cette imperméabilité permanente est obtenue en calant à chaud le collier d'acier formant l'épaulement entre les rondelles de mica de dessus et de dessous, directement sur la couverture de mica de l'électrode centrale. Ceci produit une clôture étanche indépendante de changements de température, et empêche la détérioration rapide de la bougie, qui est produite surtout par la fuite des gazes.

Il est à remarquer aussi que le mica employé pour l'isolement est traité par un procédé spécial donnant une telle résistance à la chaleur qu'un surchauffage de courte durée ne lui cause aucun détriment permanent.

La bougie Lodge A. 20 convient aux moteurs d'avions de compression moyenne, mais employée dans des moteurs de haute compression opérant à pleine charge elle est exposée a se surchauffer, causant un allumage prématuré. Pour adapter une bougie de cette construction aux moteurs de haute compression il a été nécessaire de découvrir un moyen de perfectionner le facteur thermique de la bougie sans réduire sa resistance à l'huile et à la suie. Pour ceci il est nécessaire d'augmenter la conduction thermique à travers la bougie. La manière évidente de le faire est d'employer du cuivre. Mais il est difficile d'y mettre une quantité suffisante, sans réduire sensiblement soit l'isole-

quantité suffisante, sans réduire sensiblement soit l'isolement soit la solidite de la

tige d'acier central.

Diverses méthodes one été essayées, entre autres le montage d'un mince manchon de cuivre entre la tige centrale et l'isolement de mica. Cette méthode a produit une amélloration surprenante. La bougie ainsi construite est la Lodge A.30. Elle convient à presque tous les moteurs modernes à haute compression pour avions.

Avec certains moteurs de puissance exceptionellement haute, comme les Rolls-Royce "F," on a trouvé que même la Lodge A.30 n'est pas tout à fait capable de register à la grande chaleur pendant les essais à pleine charge, et il a été nécessaire de construire une bougie d'encore plus grande résistance à la chaleur. On y a réussi en introduisant dans la tige centrale à son extrémité intérieure un court noyau de cuivre.

Cette construction coûte beaucoup plus cher mais l'action combinée du novau et du manchon de cuivre donne à la bougie une résistance exceptionelle à la grande chaleur.

Les bougies d'aviation Lodge seront exposées au Stand Lodge, oN. 7, Galerie "A," a l'Exposition Aéronautique à Paris. On y trouvera aussi les modèles spéciaux pour les moteurs Gipsy et lest moteurs américans, ainsi qu'une nouvelle séries de bougies légères de haut rendement avec de courtes projections pour faciliter le capotage du moteur. Un élément intéressant qui sera exposé est une des bougies actuellement employé dans le moteur de l'avion du Flt. Lt. Waghorn lorsqu'il gagna la Coupe Schneider. Ces bougies furent employées aussi dans l'avion qui détient le Record du Monde pour la vitesse en avion.

Un point trés important dans le soin des bougies et dont le systéme d'allumage profite géneralement est le maintien précis de la distance correcte au pont d'allumage. Pour encourager et faciliter ceci la société Lodge fournit des calibres monté sur an anneau brisé élégant, avec instructions detaillées en anglais et en plusieurs autres langues. On donnera un de ces anneaux aux visiteurs au Stand Lodge à l'Exposition, ainsi qu'a tout pilote ou ingénieur licencie qui en fait la demande à la société, dont l'addresse est Lodge Plugs Ltd., Rugby, Angleterre.

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# THE PALMER TYRE, LTD.

**HEAD OFFICE: 100-106, CANNON STREET, LONDON, E.C.4.**

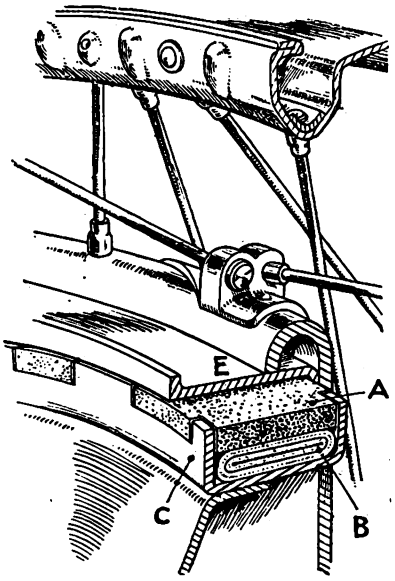


Fig. 1.

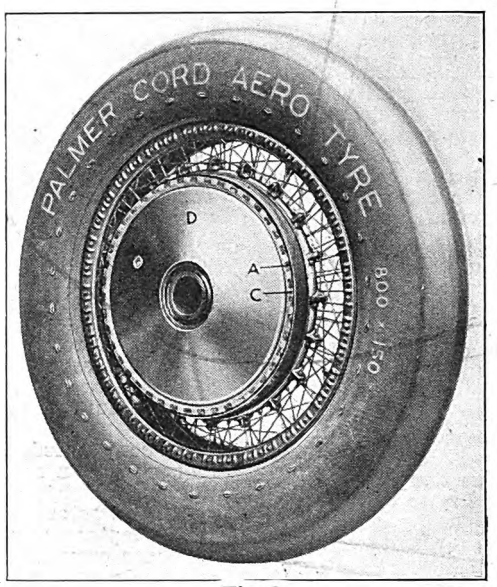


Fig. 2.

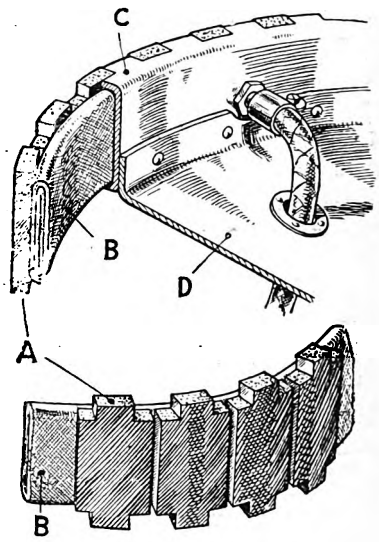


Fig. 3.

The need for an efficient braking device for use on the landing wheels of aircraft has long been recognised, but in the main, experiments have utilised the principle of the internal expanding two-shoe or three-shoe type of brake, as is employed in car construction.

One of the principal drawbacks to such brakes is that of excessive weight, and a further very important point is that the pressure of the shoes is always unequal, with the result that the drums become distorted.

The Palmer Tyre, Ltd., have, after long research, succeeded in producing an aeroplane wheel brake which completely overcomes the existing drawbacks.

It is exceedingly light in weight, but gives exceptionally strong braking effect. It is of the fluid pressure type, and consists of an annular expansion chamber, to which are attached a complete ring of brake blocks, which, when the brake is in operation, are forced into frictional contact with the inner side of the brake drum. The pressure required for even a considerable braking effect is small, this owing to the fact that there is nearly 100 per cent. contact between the brake blocks and the drum, and as the pressure exerted is uniform over the whole area, the drum itself can be much lighter than is normally employed when used in conjunction with the ordinary shoe type brake (see illustrations 1 and 2).

The drum support is made perfectly circular and concentric with the wheel before the drum is placed into position, so that distortion of the drum during the process of wheel building and trueing is impossible, and if small distortions should occur, as the result of shock while in use, the efficiency of the brake is unimpaired, as the expansion chamber to which the brake blocks are attached "breathes" in sympathy with any small irregularities in the drum.

The brake blocks are the only parts of the whole system where wear is likely to occur, and these can be renewed by the simple operation of lifting out the expansion unit and dropping another in its place (see illustration).

A very novel feature of the Palmer Brake, when air operated, is the foot-control relay valve, by means of which the braking pressure can be perfectly controlled, and the application or release of the brake made just as gradual as desired.

Another interesting point is that no manual effort is required to apply the brake. The pedal of the foot-control relay valve is operated, and the feel of the brake obtained, in an exactly similar manner as a motor car is controlled by the accelerator pedal.

The advantages of Palmer Landing Wheel Brakes for aircraft are considerable.

They enable the take-off to be made without the assistance of outside help; it is also shortened, as the engine may be run at a greater speed without causing the machine to creep.

The landing run is much reduced, so that alighting in confined spaces and on the decks of aircraft carriers becomes a perfectly practical proposition.

Machines may be accurately steered when on the ground, so that man-hauling can be almost entirely dispensed with. Moreover, steering is effective, whether the engine is running or not, an important advantage in a forced landing.

La nécessité d'un moyen efficace de freinage pour les roues d'atterrissage d'avions a été longtemps reconnue. En général, on a expérimenté avec le principe de l'expansion internale du frein à deux ou trois sabots, comme à la construction d'automobiles.

Un des principaux désavantages des freins de cette sorte est leur poids excessif. Un autre grave inconvénient est que la pression des sabots est toujours inégale, ce qui cause la distorsion des tambours.

La société Palmer Tyre a, après de longues études, réussi à produire un frein pour roue d'avion qui surmonte ces désavantages.

Il est très léger mais donne un freinage extrêmement fort. Il est du genre de pression fluide, et consiste en une chambre annulaire à expansion, à laquelle est fixée un anneau complet de sabots de frein. Lorsque le frein opère, les sabots sont mis en contacte frictionel avec l'intérieur du tambour. La pression requise pour un freinage, même considérable, est légère car il y a contact presque tout entier entre les sabots et le tambour, et comme la pression est appliquée uniformément sur son étendu entière, le tambour lui même peut être beaucoup plus léger que celui généralement employé avec le genre ordinaire de frein à sabots. (Voire les illustrations 1 et 2.)

Le soutien du tambour est rendu parfaitement circulaire et concentrique avec la roue, avant que le tambour ne soit mis en position, de sorte qu'il lui est impossible de se distordre pendant la construction et l'ajustement de la roue. Si de petites distortions ont lieu, à cause de choc au cours d'usage, l'éfficacité du frein n'en est pas amoindrie, parce que la chambre à expansion à laquelle les sabots sont fixés "respire" en sympathie avec de telles petites irrégularitiés du tambour.

Les sabots sont les seules parties du système exposées à s'user, et ils peuvent être renouvelés simplement en otant l'unité d'expansion et en les remplacant par un neuf. (Voire l'illustration 3.)

Un dispositif intéressant du frein Palmer est la soupape de relais de la pédale de commande, au moyen de laquelle la pression des freins est parfaitement contrôlée. L'application ou la libération des freins peut être aussi graduel que l'on désire.

Il est à noter aussi qu'il ne faut aucun effort manuel pour mettre le frein. La pédale de contrôle à pied pour la soupape de relais est opéré, et la sensation de freinage est obtenu exactement comme avec la pédale de l'accelérateur d'une automobile.

Les avantages des freins Palmer pour roues d'atterrissage d'avions sont considérables.

Ils permettent un décollage sans aide extérieure, qui est rendu plus court, d'ailleurs, en permettant à pleins tours un meilleur essai du moteur sans que l'avion se mette en mouvement.

L'atterrissage est réduit de beaucoup, et devient facile dans des espaces limités ou sur les navires porte-avion. On peut aussi arrêter un avion sur un terrain en pente.

Les avions peuvent être dirigés sur le vol avec précision, de sorte qu'on peut se passer presque entièrement de la main d'oeuvre. De plus, la direction est efficace, que le moteur soit en marche ou non, un grand avantage lors d'un atterrissage forcé.

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# SHELL-MEX LTD.

**HEAD OFFICE:—SHELL CORNER, KINGSWAY, LONDON, W.C.2.**

Shell-Mex, Ltd. is the British branch of the vast Shell organisation which markets petroleum products all over the World. The most important of their products from the point of view of aviation are Shell petrol and Golden Shell lubricating oil.

From the very beginning of aviation in Great Britain the Shell Company has played an important part in supplying the right fuel. To-day they may be regarded as one of the most important firms connected with Aviation, supplying as they do the essential spirit for all aircraft engines.

To cope with the remarkable progress made in international flying in recent years the company has perfected a distributing organisation so that it is possible to obtain Shell petrol and oil anywhere throughout the entire civilised World.

It is impossible to publish a list of the prominent long distance flights to all points of the globe which have relied on the Shell organisation for their progress but two very recent examples may be cited as examples of this wonderful organisation.

Between October 5 and October 13 Mr. R. F. Caspareuthus flew from London to Cape Town, a distance of 6,000 miles in 8 days flying in a D. H. Puss Moth.

Mr. Caspareuthus used both Shell petrol and Golden Shell oil and he was able to take in supplies of these at Lympne, Pisa, Athens, Cairo, Wadi Halfa, Khartum, Juba, Entebbe, Abercorn, Broken Hill, Buluwayo, Pretoria and Cape Town. An idea of the excellent refuelling arrangements at all these places can be gathered when the total elapsed time for the 6,000-miles is taken into consideration.

Some weeks later Mr. Lawrence Hope, Managing Director of Air Taxis Ltd. was commissioned at very short notice to fly to Addis Ababa in Abyssinia to fetch press photographs of the coronation of the Emperor of Ethiopia. Without giving any previous warning to the Shell company Mr. Hope flew out to Addis Ababa and back to London in remarkably quick time, the return flight with the press material being made in only 5 days for the 5,000 miles.

Throughout the flight Mr. Hope used Shell petrol and Golden Shell oil and he was able to get supplies at every aerodrome on which he landed, even in Somaliland and in Abyssinia, both of which are well off the beaten track.

Aviation grades of Shell petrol and oil are now available on aerodromes throughout the World and it is largely due to this organisation that so large a number of long distance flights to distant parts of the World are undertaken with confidence and completed with success.

The Shell company has done all it possibly can to help aviation, not only by getting together their wonderful organisation for the distribution of their products but also by using aircraft themselves wherever possible.

In England the company operates two aeroplanes for the rapid transport of its own officials to all parts of the country and also for the continual research work that the company is making in connection with the development and improvement of its aviation products. In the United States the Shell company has six aeroplanes in operation and it also uses aircraft in Australia, India, South Africa, East Africa, the Argentine Republic, France, Chile and Egypt.

So far only two prominent flights made with Shell products have been mentioned but it must be remembered that the company also supplies fuel in bulk to the military and civil flying services of all countries. The recently-opened air line to the Netherlands East Indies across Europe and half of Asia uses Shell spirit. Imperial Airways, Ltd. on the India route uses Shell products and the England to the Cape route to be opened next year will operate on Shell petrol.

Golden Shell oil is now approved by all the important manufacturers of aero-engines and it is significant that this official recognition has been supported by its success in some of the outstanding achievements during 1930.

La société Shell-Mex Ltd. constitue la branche anglaise de la vaste organisation Shell qui s'occupe de la vente des produits pétrolifères dans toutes les parties du monde, et, en ce qui concerne l'aviation, ses produits les plus importants sont l'essence Shell et l'huile de graissage Golden Shell.

Depuis le début de l'aviation en Grande Bretagne, la Compagnie Shell n'a cessé d'y jouer un rôle très important, et, actuellement on peut certes la compter parmi les plus fortes entreprises qui se rattachent à l'aéronautique, étant donné qu'elle est en mesure d'assurer toutes fournitures de carburants parfaitement appropriés, dont ne sauraient se passer les moteurs d'aviation. Afin de faire face aux remarquables progrès réalisés dans l'aéronautique ces dernières années, la Compagnie a su perfectionner ses moyens de distribution à un point tel qu'il est possible désormais de trouver des approvisionnements d'essence et d'huile Shell dans toutes les régions civilisées du globe.

Bien qu'il soit impossible de publier ici la liste complète des grands raids mondiaux qui se sont effectués avec le concours des stations de ravitaillement Shell en cours de route, on peut pourtant citer deux exemples tout récents qui font ressortir d'une façon frappante l'excellence de cette magnifique organisation.

C'est ainsi que, du 5 au 13 octobre dernier, Mr. R. F. Caspareuthus a accompli le trajet aérien de Londres au Cap, soit une distance de 9.655 kms. en 8 jours de vol, sur un D.H. Puss Moth.

Mr. Caspareuthus, qui avait adopté l'emploi de l'essence Shell et de l'huile Golden Shell, a pu effectuer ses ravitaillements successifs à Lympne, Pise, Athènes, au Caire, à Ouadi-Halfa, Khartoum, Juba, Entebbe, Abercorn, Broken Hill, Buluwayo, Pretoria et Cape Town, et, pour se faire une idée de l'excellence des conditions de ravitaillement à chacune de ces différentes étapes, il suffit de se rappeler le temps total mis par l'aviateur pour accomplir ce parcours entier de 9.655 kms.

Quelques semaines plus tard, Mr. Lawrence Hope, administrateur-délégué de la société Air Taxis, Ltd., fut chargé à l'improviste de se rendre immédiatement à Addis-Ababa, Abyssinie, afin d'en rapporter pour les journaux les photographies du couronnement de l'Emperor d'Ethiopie. Sans aucun avertissement préalable à la Compagnie Shell, Mr. Hope a pu faire le voyage d'aller et retour de Londres à Addis-Ababa dans un lapse de temps remarquablement court, puisqu'il ne lui a fallu en tout que 5 jours pour ramener les documents destinés à la Presse, après un parcours total de plus de 8,000 kms.

Pendant toute cette randonnée, Mr. Hope a fait usage de l'essence Shell et de l'huile Golden Shell, ayant pu s'en ravitailler à chacun des aérodromes où il a atterri, même au Somaliland et en Abyssinie, deux contrées fort écartées des voies ordinaires du traffic mondial.

Il existe donc des stocks d'essence et d'huile Shell de qualités appropriées à l'aviation dans les aérodromes du monde entier, et c'est d'ailleurs dans une grande mesure grâce à la puissante organisation de la Compagnie qu'il a été possible d'entreprendre avec confiance et de terminer avec succès un si grand nombre de raids à longue distance.

La Compagnie Shell a fait tout ce qui dépendait d'elle pour seconder l'aviation, non seulement en créant la merveilleuse organisation grâce à laquelle elle effectue la distribution de ses produits, mais aussi en se servant elle-même de l'avion partout où elle en a la possibilité.

En Angleterre, la Compagnie utilise deux aéroplanes pour le transport rapide de ses représentants à destination de toutes les parties du territoire, également pour les recherches qu'elle ne cesse de poursuivre en vue du développement et de l'amélioration des produits qu'elle fournit à l'aéronautique. Elle possède six aéroplanes aux Etats-Unis, et utilise aussi des avions en Australie, les Indes, Anglaises, l'Afrique du Sud, l'Afrique Orientale, l'Argentine, la France, le Chile et l'Egypte.

Nous n'avons cité ici que les raids les plus retentissants qui se soient accomplis avec emploi des produits Shell, mais il convient d'ajouter que la Compagnie fournit également, par chargements entiers, le combustible nécessaire aux services d'aviation militaires et civils de tous pays. Disons encore que la ligne aérienne inaugurée récemment entre les Pays-Bas et les Indes Orientales Néerlandaises, traversant toute l'Europe et la moitié de l'Asie, utilise de l'essence Shell, et que la société Imperial Airways, Ltd., qui emploie des produits Shell sur sa ligne des Indes, doit faire aussi usage de l'essence Shell pour la nouvelle ligne de l'Angleterre au Cap qu'elle doit inaugurer l'année prochaine.

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# TITANINE-EMAILLITE LTD.

**HEAD OFFICE: EMPIRE HOUSE, 175, PICCADILLY, LONDON, W.1.**

Titanine-Emaillite Ltd., whose Head Office is at Empire House, 175, Piccadilly, London, W.1, was established in 1915, and was then known as the British Aeroplane Varnish Co. During the War they supplied large quantities of dope to the British Flying Services. In 1918 the firm adopted the name of its main product and became known as Titanine Ltd. In 1924 the title was again altered to Titanine-Emaillite Ltd., on the acquisition of trade marks and formulæ of what had hitherto been a rival concern, The British Emaillite Co. Ltd. (in Liquidation). Since the War the firm had extended its activities practically all over the world.

**The Part that Aircraft Dopes and Lacquers Play in Flying.**

The three main factors in treating fabric-covered components of aircraft are:—

(1) Obtaining tautness and smoothness of finish. These reduce skin friction.

(2) Obtaining at the same time as above good filling combined with minimum additional weight.

(3) Obtaining durability and a constant tautness under variable climatic conditions.

In these respects the "Titanine" Dopes and Finishing Varnishes are unequalled, a fact which is universally known, and results in trade inquiries from all parts of the World.

It is perhaps not so well-known that "Titanine" Dopes and Varnishes can be used equally satisfactorily for treating plywood wings and fuselages.

For metal construction "Titanine" Cellulose Lacquers are unrivalled. They resist petrol, oil and dope, and are supplied to any shade required. For seaplane floats and hulls, Titanine-Emaillite Ltd. manufacture a special lacquer which, in addition to the above qualities, also resists sea-water and tends to resist fouling.

"Titanine" doping schemes were used on the World-famous flights made by the following pilots:—

(1) Wing-Commander Kingsford Smith (East to West Transatlantic Flight).

(2) Wing-Commander Kingsford Smith (London-Australia in 10 days).

(3) Mr. C. D. Barnard (London-India and Return).

(4) Mr. C. D. Barnard (London-Capetown and Return).

(5) Mr. C. D. Barnard (London-Tangiers and Return in two days).

(6) Mr. C. D. Barnard (London-Malta and Return in two days).

(7) Flight-Lieut. R. R. Bentley (Two Flights England-Cape Town).

(8) Mr. Bert Hinkler (London-Australia).

(9) Mr. C. Chamberlin (New York-Germany).

(10) Colonel Lindbergh (New York-Paris).

(11) Commander Byrd (North Pole Flight).

(12) Commandante Franco (Transatlantic Flight).

(13) The Marchese de Pinedo (Rome-Tokio-Rome).

(14) Sir Alan Cobham (London-Australia-London).

Among their other activities, Titanine-Emaillite Ltd. supply Cellulose Lacquer finishes for all metal work and wood work. They also supply Cellulose Lacquer for both wooden and metal airscrews.

With few exceptions, "Titanine" products are used by all the large aircraft constructors in Great Britain and abroad, and to supply the foreign demands it became necessary a few years ago to open up factories both on the Continent and in the United States.

These associated companies are as follows:—

Titanine Inc., Morris and Elmwood Avenues, Union, Union County, N.J., U.S.A.

Soc. An. Italiana Vernici "Titanine," Via Durini, 1, Milano, Italy.

Titanine-Werk G.m.b.H., Am. Hafen, 9, Hemelingen-bei-Bremen, Germany.

L'entreprise Titanine-Emaillite Ltd. ayant son siège social à 175, Piccadilly, Londres, W.1, fut établie en 1915, étant à cette époque connue par le nom British Aeroplane Varnish Co., et au cours de la guerre, elle fournit de grandes quantités d'enduit au service d'aviation britannique. En 1918 la firme affecta le nom de son produit principal et fut connu sous la désignation de Titanine Ltd. En 1923 le nom de la firme fut encore changé à ce de Titanine-Emaillite Ltd., après avoir aquis les marques de fabrique et les procédés de son concurrent jusque là, la British Emaillite Co. Ltd. (en liquidation). Depuis la guerre la firme a ramifié ses activités à peu près partout dans le monde entier.

**Le rôle que joue l'enduit et le vernis dans d'aviation.**

Dans la préparation des parties entoilées d'un avion trois conditions principales s'imposent:—

(1) D'obtenir une bonne tension et un fini lisse; ceci pour reduire la friction de surface.

(2) D'obtenir en même temps une bonne impregnation tout en maintenant le poids supplémentaire aussi bas que possible.

(3) D'obtenir une bonne durabilité ainsi qu'une raideur constante en toutes conditions climatiques.

A ces égards les enduits et vernis de finissage "Titanine" sonts hors concurrence—fait universellement connu et auquel d'ailleurs il faut attribuer les demandes du commerce arrivant de toutes parties du monde.

Peut-être qu'on le sait moins bien, mais les enduits et vernis "Titanine" conviennent tout aussi bien au traitement des ailes et des fuselages en bois contreplaqué.

Pour les constructions métalliques les vernis à base de cellulose "Titanine" sont sans pareil. Ils résistent à l'essence, à l'huile et à l'enduit et peuvent être livrés en n'importe quelle nuance de couleur. Pour les flotteurs et les coques des hydravions la Titanine-Emaillite Ltd. produit un vernis spécial qui, en outre des qualités ci-dessus dites, résiste également à l'eau de mer et qui assiste à empêcher la décomposition.

Le vernissage à la "Titanine" a été adopté sur les fameux raids mondiaux exécutés par les pilotes suivants:

(1) Wing-Commander Kingsford Smith (Vol transatlantique est-ouest).

(2) Wing-Commander Kingsford Smith (Londres-Australie en 10 jours)

(3) Mr. C. D. Barnard (Londres-Indes et retour).

(4) Mr. C. D. Barnard (Londres-Cap et retour).

(5) Mr. C. D. Barnard (Londres-Tangier et retour en deux jours).

(6) Mr. C. D. Barnard (Londres-Malte et retour en deux jours).

(7) Lieut. R. R. Bentley (Deux vols Angleterre-Cap).

(8) Mr. Bert. Hinkler (Londres-Australie).

(9) Mr. C. Chamberlin (New York-Allemagne).

(10) Colonel Lindbergh (New York-Paris).

(11 Commandant Byrd (Vol au Pôle Nord).

(12) Commandant Franco (Vol Transatlantique).

(13) Le Marchese de Pinedo (Rome-Tokio-Rome).

(14) Sir Alan Cobham (Londres-Australie-Londres).

Parmi d'autres occupations, la Titanine-Emaillite Ltd. produit un vernis à base de cellulose pour tous objets métalliques et de bois. Elle fournit également un vernis de cellulose spécial pour les hélices métalliques et de bois.

A peu d'exceptions près, les produits "Titanine" se trouvent en emploi chez tous les constructeurs d'avions d'importance dans la Grande Bretagne et à l'étranger, et pour satisfaire au demandes de l'étranger il fut nécessaire, il y quelques années, d'établir des usines au Continent d'Europe et dans les Etats-Unis de l'Amérique.

Ces compagnies associés sont comme suite:—

Titanine Inc. Morris and Elmwood Avenues, Union, Union County, N.J., U.S.A.

Soc. An. Italiana Vernici "Titanine," Via Durini, 1, Milano, Italy.

Titanine-Werk G.m.b.H., Am. Hafen, 9, Hemelingen-bei-Bremen, Germany.

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# REYNOLDS TUBE COMPANY, LTD.

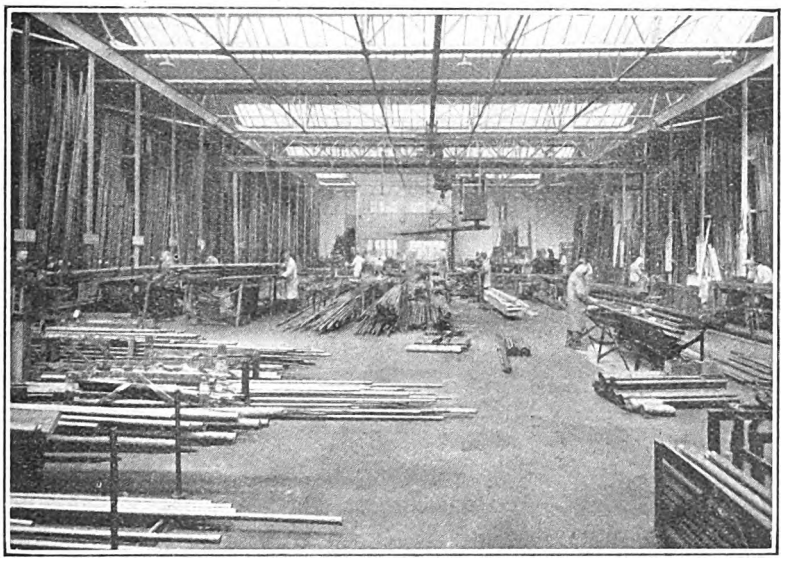
**HEAD OFFICE AND WORKS: HAY HALL WORKS, TYSELEY, BIRMINGHAM.**

The change-over from wooden to all-metal construction which has been such a noticeable feature of British aircraft policy in the last few years has been made possible by the way in which the suppliers of raw materials have risen to the occasion and produced very special materials to the requirements of the Aircraft Industry.

This is specially true of the tube manufacturers who have had to contend with a number of difficult technical problems in order to produce tubes of the large diameter and thin gauge which have been called for by aircraft constructors. But the makers of tubes have solved this problem together with many others. Indeed to-day the British manufacturer can produce a bewildering variety of shapes and sizes of tube in a very wide range of material.

Nearly two million feet of tubing produced by the Reynolds Tube Company Ltd. of Birmingham was used in the construction of British aeroplanes during the last 18 months and the requirements for this material are steadily increasing.

Reynolds Tube Company Ltd. can supply Aircraft Tubing to any specification in general use. Their standard of inspection, which has been approved by the British Air Ministry, is very high and covers the testing of the raw material to the production of the finished tubing.



La tendance à abandonner le bois pour le métal exclusivement, dans la construction d'avions, qui se manifeste depuis quelques années, parmi les constructeurs anglais, eût été vaine sans la collaboration des fabricants de matières premières, qui n'ont pas manqué d'être à la hauteur des nouvelles exigences de l'industrie, et de mettre à la disposition de celle-ci des matériaux de qualité tout à fait spéciale.

Ceci est vrai, surtout, des fabricants de tubes, qui ont eu à surmounter de nombreux et difficiles problèmes techniques, avant de pouvoir produire les tubes de grand diamètre et d'épaisseur réduite exigés. Les fabricants ont, cependant, réussi à solutionner, non seulement ces problèmes de production, mais encore bien d'autres, au point que, de nos jours, les fabricants britanniques mettent, à la disposition de l'industrie, une série de tubes de formes et de dimensions de variété presque inimaginable, comportant l'usage des matériaux les plus divers.

La Reynolds Tube Company Ltd. peut fournir des tubes pour aéroplanes sur les données de n'importe quelle spécification courante. Les règles d'inspection appliquées, courrant toutes phases de la fabrication, de l'état de matière première à l'article fini sont approuvées par l'Air Ministry.

# THE GALLAY RADIATOR CO., LTD.

**HEAD OFFICES AND WORKS: 103-105, SCRUBBS LANE, WILLESDEN, N.W.10.**

With the ever increasing output of the British Aircraft Industry, constructors of aeroplanes are finding that the letting out of sub-contracts is an economical proposition. The system has the marked advantage that certain firms can concentrate on the production of articles which need a specialised technical equipment. This applies particularly to the work which is done by copper and tin-smiths whose craft is quite specialised and although a large number of firms employ such craftsmen they find they can save money when they are building machines in quantity by having petrol tanks and the like built under sub-contract by a firm which has been organised solely to cope with that class of work.

The Gallay Radiator Co. Ltd. specialise in the building of tanks and radiators as well as other forms of sheet metal work for aircraft. During the war 1914-1918 they produced very large quantities of radiators and tanks for aeroplanes and flying boats. They have already built a large number of tanks for the Blackburn Bluebird which is so well-known as the light aeroplane with side-by-side seating. They are now turning out seven or eight petrol tanks a week for the Armstrong Whitworth Atlas Army Co-operation machine.

Making sheet-metal parts to the very close limits which are required in aircraft design is not easy but the long experience of the Gallay Radiator Co. Ltd. has enabled them to turn out their jobs exactly to jig and these tanks are an interesting example of the high standard of their work. They leave the works pressure-tested and absolutely ready for installation. The customers have only to place the tanks in position and connect the pipe-lines. There is no more work to be done on them.

The fact that the firm is approved by the British Air Ministry is a striking tribute to the careful system of inspection in force at the works and the conscientious workmanship of the firm's employees. These two factors contribute much to the high reputation which the Gallay Radiator Co. Ltd. has achieved.

Avec la production sans cesse croissante de l'industrie aéronautique anglaise, les constructeurs d'avions trouvent économique de se faire approvisionner par les fournisseur sous-contracts. La système presente cet avantage marqué que certaines maisons peuvent se concentrer sur la proluction d'articles qui exigent un équipement technique spécialisé. Tel est particulièrement le cas pour les travaux à exécuter par des chaudronniers et des ferblantiers, dont le métier est tout à fait spécialisé; et bien qu'un grand nombre de maisons emploient de ces artisans, elles constatent qu'elles peuvent realiser des économies, lorsqu'elles construisent des avions en grande série, en faisant fabriquer les réservoirs à essence et autres pièces analogues en sous-contrat par des établissements qui sont organisés uniquement pour l'exécution de ces genres de travaux.

La société Gallay Radiator Co. Ltd. se spécialise dans la fabrication des réservoirs et des radiateurs ainsi que d'autres pièces métalliques en tôle pour avions. Pendant la guerre de 1914-1918 elle a produit d'énormes quantités de radiateurs et de réservoirs pour aéroplanes et hydravions. Elle a aussi fabriqué un grand nombre de réservoirs pour le Blackburn Bluebird, l'avion léger si bien connu à sièges côte à côte. Elle est en train de sortir en ce moment sept à huit réservoirs à essence par semaine pour l'avion Armstrong Whitworth Atlas, appareil de coordination militaire.

La fabrication de pièces métalliques en tôle présentant la précision de dimensions exigée dans la construction aéronautique n'est pas chose facile, mais la longue expérience de la Gallay Radiator Co. Ltd. lui permet de produire des pièces absolument conformes aux gabarits, et ces réservoirs sont un intéressant exemple de l'excellence de son travail. Ils laissant l'usine après avoir subi des éprevues sous pression et absolument prêts à être installés. Les clients n'ont qu'à fixer les réservoirs en place et à y raccorder les tuyauteries. C'est tout ce qu'ils demandent en fait de travail.

Le fait que cette firme est agrée par le Ministère de l'Air anglais est tout à l'honneur du rigoureux système de contrôle qui se pratique aux usines et du consciencieux travail des ouvriers qu'elle emploie. Ce sont là deux facteurs qui contribuent en grande mesure à la haute réputation que s'est acquise la Gallay Radiator Co. Ltd.

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## THE WILLIAMSON MANUFACTURING CO., LTD.

**HEAD OFFICE: LITCHFIELD GARDENS, WILLESDEN GREEN, LONDON, N.W.10.**

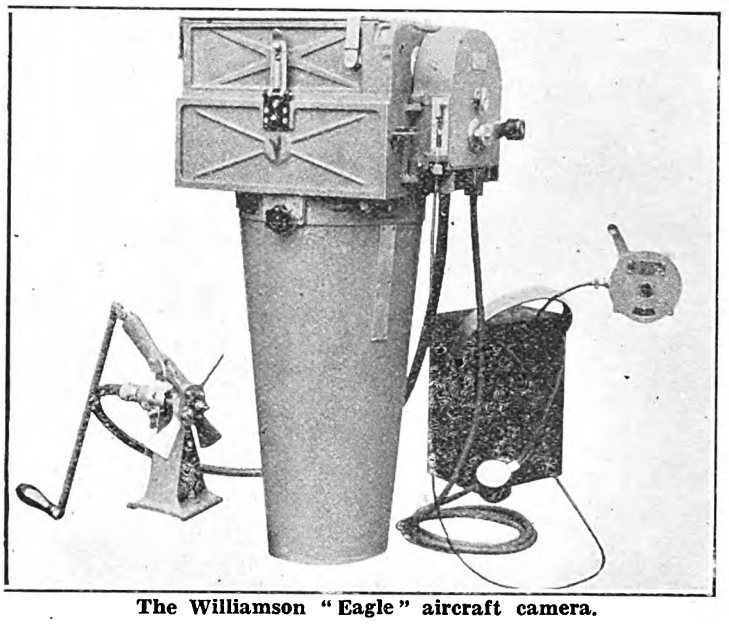
The Williamson Manufacturing Co. Ltd. specialises in the manufacture of air photographic equipment and are the makers of the well-known "Eagle" aircraft camera (R.A.F. Service Type F.8). A wide range is covered, including Hand-Held Cameras, camera mountings, enlargers, developing apparatus, and travelling dark rooms.

"Eagle" Aircraft Cameras are widely used for Military photography, for Naval Hydrographic work and for air surveys by Civil Survey Companies and Government Survey Departments.

The "Eagle" camera can be readily installed in practically any type of aircraft, and, apart from Service aircraft, it is used in such varied types as the Moth, Puss-Moth, Avian, Avro Trainer, Fairey IIIF., Vickers Vespa and Gloster A.S.31.

For commercial air photography Hand Held Cameras are made using plates or films and taking pictures of 3¼ x 2¼ ins. and 5 x 4 ins.

Full particulars of any of these products will be sent on request, and inquiries on all matters relating to air photographic apparatus are solicited.



**The Williamson "Eagle" aircraft camera.**

L'activité de la Williamson Manufacturing Company se concentre sur la production d'équipement photographique aérien, et la société fabrique l'appareil très connu sous la marque "Eagle" (R.A.F. Service Type F.8.). Elle construit également des appareils photographiques portatifs, bâtis, aggrandisseurs, matériels de développement, et des chambres obscures mobiles.

Les appareils photographiques Eagle sont utilisés grandement pour les vues aériennes dans l'aviation militaire, dans les entreprises navales hydrographiques, et dans les levers des plans aériens des Departements et Sociétes Cartographiques.

L'appareil "Eagle" peut être monté dans presque tous les avions, et en outre de son usage pour l'aéronautique militaire, il a été installé dans les modèles suivants: le Moth, le Puss - Moth, l'Avian, l'Avro Trainer, le Fairey IIIF, le Vickers Vespa, et le Gloster A.S.31.

Pour la photographie aérienne commerciale, des appareils portatifs sont fabriqués, à plaque ou à pellicule, formats 8.2 cm. x 5.7 cm., et 12.8 cm. x 10.2 cm.

Tous renseignements seront envoyés sur demande, et la société se met à la disposition de tout intéressée.

## ROSS, LTD.

**HEAD OFFICE: 3, NORTH SIDE, CLAPHAM COMMON, S.W.4.**

The advantage of air survey over the older method of land survey has been apparent during the past few years.

A certain amount of photographic recording work was undertaken at the beginning of the war 1914-18 with the lens that were then available. The photographs obtained were found to be of such immense value that the British optical firms were approached with a view to producing better lenses to suit the exacting requirements of this work.

Ross Ltd. were successful in designing a lens known as the Airo Xpres F.4.5, which was corrected for astigmatism and flatness of field over an angle of 40 to 50 degrees. This lens was considered to be an advance over previous types and it was proved under service conditions to be equal to, if not better than, the German lenses.

In modern methods of air survey it has been found necessary to produce photographs of even greater accuracy, and the problem was placed before the technical staff of Ross, Ltd., to construct a lens having the combined qualities of large relative aperture and wide angle of view—from the designer's point of view two factors which are diametrically opposed. It will be readily appreciated that with a lens having a relatively large aperture photographs can be obtained under adverse weather conditions, and also a considerable amount of flying time can be saved when a large angular field is a characteristic of the lens. After months of computing and research work, the Ross F.4 Wide Angle Xpres Lens has been produced as a solution to this problem. In this lens the aperture of F.4 has been attained together with an angular view of 70 deg.

Air photographs are subjected to very critical measurements of locating positions of objects, and it is imperative that the lens used should be designed to give photographs as free as possible from distortion of the image. The elimination of this aberration is very difficult to achieve in a lens of wide angular field, and the Ross F.4 Wide Angle Xpres, especially designed for this class of work, is a remarkable improvement over existing types of objectives. Ross lens are used exclusively by the Williamson Manufacturing Co., Ltd.

L'avantage de la topographie aérienne sur l'ancienne méthode d'arpentage s'est affirmée au cours de ces dernières années.

Dès le commencement de la guerre de 1914-1918 on avait entrepris certaines opérations topographiques avec l'aide des objectifs dont on disposait alors. Les photographies ainsi obtenues ont rendu de si précieux services qu'on a engagé les fabricants anglais d'instruments d'optique à produire des objectifs mieux en rapport avec les exigences de ce genre de travaux

C'est alors que la maison Ross Ltd. réussit à construire un objectif dit "Airo Xpres" F.4.5, qui était corrigé pour l'astigmatisme et la planité de champ sur un angle de 40 à 50 degrés. Cet objectif était considéré comme un grand progrès sur les types antérieurs, et il se montra égal aux objectifs allemands sinon meilleur.

Dans les méthodes modernes de topographie aérienne on a trouvé nécessaire de produire des photographies d'une précision encore plus grande, et le personnel technique de Ross Ltd. s'est vu poser le problème de la construction d'un objectif possédant tout à les fois les qualités d'une grande ouverture relative et d'un large angle de vue—deux choses qui, du point de vue technique, sont diamétralement opposées. On comprend bien qu'avec un objectif possédant une ouverture relativement grande il est possible d'obtenir des photographies lorsque les conditions atmosphériques ne sont pas favorables, et qu'on peut abréger considérablement la durée des vols avec un objectif caractérisé par un large champ angulaire. Après des mois de calculs et de recherches le problème a enfin trouvé sa solution dans l'objectif grand angle 'Xpres' Ross F.4. On est parvenu à réaliser dans cet objectif une overture de F.4 en même temps qu'un angle de vue de 70 deg.

Les photographies aériennes sont soumises à des mesures d'une précision critique pour déterminer les positions des différents objets, et il est impérieux que l'objectif utilisé puisse donner des images photographiques aussi exemptes que possible de toute déformation. Or, l'élimination de cette aberration est très difficile à réaliser dans un objectif de grand champ angulaire, et le Xpres grand angle F.4 Ross, spécialement étudié en vue de cette utilisation, est un remarquable progrès sur tous les types existants d'objectifs. Les objectifs Ross sont employés exclusivement par la Williamson Manufacturing Co. Ltd.

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## MARCONI'S WIRELESS TELEGRAPH CO., LTD.

**HEAD OFFICE:—MARCONI HOUSE, STRAND, LONDON, W.C.2.**

Wireless plays an important part in the operation of commercial air services and increasing the efficiency of military and naval air forces. The Marconi Company have actively studied the problems of this branch of wireless service since 1912, and modern Marconi apparatus for aircraft and aerodromes is unequalled for efficiency, both for communications and for direction-finding services.

A new addition has just been made to the famous Marconi A.D.6 series of aircraft equipment, examples of which are in daily use on civil, military and naval aircraft in more than 30 countries in all parts of the World.

The new equipment is Type A.D.6.M, specially designed for commercial aircraft and approved by the British Air Ministry for this purpose. It incorporates a telephone-telegraph transmitter of 150 watts power and an entirely new type of aircraft receiver which is particularly selective and stable in operation.

The Type A.D.6.M. equipment meets the requirements of the Washington Convention regarding the wavelengths for civil aircraft.

Short-wave Marconi equipment using fixed aerials is particularly suitable for military and naval aircraft. Equipments of this class recently introduced are the Marconi Type A.D.19 and A.D. 21 Transmitters and the Marconi Type A.D.20 Receiver. These incorporate many special features, the A.D.19 Transmitter being fitted with a "drive" system for maintaining constancy of wavelength and providing for both telephone and telegraph working.

For inter-aircraft communication between units of a squadron the Marconi Type A.D.5 Short-wave Transmitter and A.D.12 Receiver are of proved value.

In addition to these equipments, the Marconi Company produces wireless apparatus suitable for every type of aircraft, from light privately-owned and club machines to the largest classes of aeroplanes, flying-boats and airships.

Marconi equipment specially designed for aerodrome services is installed at the London Airport, Croydon, and at many of the principal aerodromes throughout the World.

La T.S.F. joue un rôle de premier ordre dans les services commerciaux aériens et augmente de beaucoup l'efficacité des corps aéronautiques militaires et navals. La société Marconi a soigneusement étudié de près les questions de cette section du service de T.S.F. depuis 1912, et les appareils Marconi modernes pour avions et aérodromes ne sont point surpassés au point de vue d'efficacité, non seulement pour la transmission des communications mais également pour le service d'orientation.

On vient d'ajouter à la fameuse série Marconi A.D.6 pour l'équipement des avions de nouveaux appareils, dont quelques pièces se trouvent déjà en emploi régulier sur les avions civiles, militaires et navals de plus de 30 pays et en toutes parties du monde.

Le nouvel agencement est le type A.D.6.M., construit pour avions commerciaux spécialement et a été agrée par l'Air Ministry Britannique pour cet emploi.

La fourniture A.D.6.M. répond aux conditions établies par la Convention de Washington au point de vue de longeur d'onde pour avions civils.

L'équipement Marconi d'onde courte comportant des antennes fixes convient par excellence pour les avions militaires et navals. Les agencements de ce genre qui viennent d'être introduits il y a peu de temps comprennent les postes émetteurs Marconi A.D.19 et A.D. 21 ainsi que le poste récepteur Marconi A.D.20. Ceux-ci présentent de nombreux traits remarquables, l'émetteur A.D.19 étant pourvu d'un "dispositif de commande" pour maintenir une onde constante et servant à la fois à la téléphonie et à la télégraphie.

Pour communiquer d'un avion d'une escadrille à l'autre, le poste émetteur d'onde courte de type Marconi A.D.5 et le récepteur A.D.12 se sont fort bien éprouvés.

En outre de ces appareils, la société Marconi livre du matériel convenable pour l'agencement de tous genres d'avions, soit pour machines privés ou de club d'aviation, soit pour les modèles d'avion du plus grand calibre, hydravions et dirigeables.

Du matériel Marconi construit spécialement pour le service d'aérodrome se trouve installé à Croydon et aux aérodromes principaux dans le monde entier.

## C. C. WAKEFIELD AND CO., LTD.

**HEAD OFFICE:—WAKEFIELD HOUSE, CHEAPSIDE, LONDON, E.C.2.**

C. C. Wakefield & Co., Ltd. the producers of "Castrol" have been prominently associated with aviation since its earliest days. At the first Air Meeting held in Great Britain at Doncaster in October, 1909 every event was won on "Castrol."

Practically every famous flight or outstanding performance made in British aviation since 1909 has been made with the assistance of "Castrol" and it is safe to say that by publishing a list of such performances it would be possible to outline the complete history of aviation in Great Britain from the earliest days.

During 1930 the following outstanding performances in aviation have been made with "Castrol" as the lubricant.

The World's Records for Distance, Duration and Speed over 2,000 kms. carrying a useful load of 500 kgs. (1,100 lbs.) by MM. Costes and Codos in a Breguet biplane (650 h.p. Hispano-Suiza engine).

The World's Records for Distance and Duration carrying 1,000 kgs. (2,200 lbs.) of useful load also by MM. Costes and Codos.

The flight by Miss Amy Johnson from England to Australia in 20 days in a D.H. Gipsy-Moth.

The World's Duration Record of 67¼ hours put up by Commandant Maddalena and Lieut. Cecconi in a Savoia S-64 monoplane (550 h.p. Fiat engine).

The winning of the King's Cup Race for the eighth time in succession.

The first direct flight from Paris to New York in a Breguet biplane (650 h.p. Hispano-Suiza engine by MM. Costes and Bellonte.

The above list of performances is by no means complete but it serves to show the international demand for this excellent lubricant.

The world-wide organisation of C. C. Wakefield & Co., Ltd. is such that "Castrol" in all grades can be obtained in almost any part of the globe with almost the same facility that it can be got in England by the average motorist. This point has been accentuated by all pilots who have made long distance flights across Europe, Asia and Africa. In all cases their eulogies on the qualities of "Castrol" have been augmented by unstinted praise concerning the remarkable service obtained from the "Castrol" agents in even the most inaccessible places.

Les Etablissements C. C. Wakefield & Co., Ltd., fabricants du "Castrol" ont puisamment collaboré au développement de l'aviation depuis son enfance. Au premier concours aéronautique tenu en Angleterre à Doncaster, en octobre 1909, chaque épreuve disputée à constitué une victoire pour le "Castrol."

Il n'est presque pas de randonnée célèbre, ni d'exploit remarquable, que l'aviation britannique ait mis à son crédit depuis 1909, qui ait eu lieu sans l'aide de "Castrol," et il est possible d'avancer, sans la moindre crainte de donner dans l'exagération, qu'il suffirait de dresser une liste de ces performances, auxquelles le "Castrol" a collaboré, pour établir en même temps le palmarès de l'aviation britannique depuis son inception.

En 1930, la marque "Castrol" a encore figuré à titre d'auxiliaire des remarquables performances aéronautiques énumérées ci-dessous:—

Les records mondiaux de la distance, de la durée et de la vitesse établis, sur un parcours de 2,000 kilomètres, avec charge utile de 500 kilogrammes, par Costes et Codos sur biplan Bréguet à moteur Hispano-Suiza de 650 h.p.

Les records mondiaux de la distance et de la durée avec charge utile de 1,000 kilogrammes, établis de même par Costes et Codos.

Le record mondial d'endurance, de 67 heures et un quart, établi par le Commandant Maddalena et le Lieutenant Cecconi sur monoplan Savoia S-64 à moteur Fiat de 550 h.p.

Le prix de la Coupe du Roi, remporté en Angleterre pour la huitième fois consécutivement.

Le premier vol direct de Paris à New-York par Costes et Bellonte sur biplan Bréguet à moteur Hispano-Suiza.

Cette liste de performances, loin d'être complète, n'a pour but que de démontrer combien est internationale la demande pour cet excellent lubrifiant.

L'organisation universelle des Etablissements C. C. Wakefield Co., Ltd., leur permit d'effectuer la fourniture de "Castrol" de toutes les catégories avec la même facilité que s'il ne s'agissait de permettre au premier-venu des automobilistes de se réapprovisionner en Angleterre. C'est là le très considérable avantage que ne cessent de louer tous les pilotes qui se sont lancés dans des randonnées de grande envergure à travers l'Europe, l'Aise et l'Afrique, et qui ne tarissent d'éloges sur les précieux services qui leur ont été rendus par les agents de la marque "Castrol" aux endroits les plus inaccessibles.

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## SOUTHERN AIRCRAFT LTD.

**HEAD OFFICE AND WORKS:—SHOREHAM AERODROME, SUSSEX.**

Southern Aircraft Ltd. specialise in the production of high-speed single-seat light aircraft and their principal type is known as the Martlet.

The Martlet is a very compact single-bay biplane which can be fitted with either the 95/105 h.p. Armstrong Siddeley Genet II air-cooled radial engine, the 120 h.p. D.H. Gipsy or 105/115 h.p. Cirrus Hermes four-cylinder in-line air-cooled engines.

The special qualities of this type are its short take-off, fast climb and excellent manœuvrability.

It is completely fitted out for high speed touring and in addition to a very comfortable cockpit, ample locker accommodation for suitcase, golf clubs, gun, fishing rods, etc. is provided.

The construction of the Martlet is mainly of wood with fabric covering.

The wings which are of the single bay type are of wood with plywood leading-edge and fabric covering. Tapering chord ailerons on all four wings are so designed as to give a very light and progressive lateral control.

The fuselage is a rectangular wooden structure with fabric covering.

The undercarriage is of the cross-axle Vee type and the springing is provided by combined oleo and coil-spring units.

The main fuel tank is carried in the top centre section thus giving direct gravity feed to the engine.

La Southern Aircraft Company's s'est spécialisée dans la construction d'avions légers monoplaces rapides, et leur modèle principal est connu sous le nom du Martlet.

Le Martlet est un biplan très compacte à une travée, muni d'un moteur Armstrong Siddeley Genet II, de 95/105 CV, en étoile à refroidissement par l'air, ou d'un D.H. Gipsy, de 120 CV, ou d'un Cirrus Hermes, 105-115 CV, moteurs à quatre cylindres en ligne à refroidissement par l'air.

Il se caractérise par un décollage très court, une montée rapide, et une maniabilité excellente.

L'appareil est complètement aménagé pour le tourisme rapide, et en outre d'un poste de pilotage très confortable, comporte une cale spacieuse pour une valise, des golf clubs, fusil, cannes à pêche etc.

La structure du Martlet est principalement en bois avec revêtement de toile. La cellule de forme biplane à une travée, est construite en bois, recouvert en toile avec les bords d'attaque en contreplaqué. Des ailerons à corde fuyante, aux ailes supérieures et inférieures, assurent une maniabilité latérale très grande.

Le fuselage est de construction rectangulaire en bois revêtu en toile.

Le train d'atterrissage est en V avec essieu, dont l'amortissement s'effectue par moyen de jambes élastiques à ressort spirale et oléo.

Le réservoir principal d'essence est porté dans la portion centrale de l'aile supérieure, permettant une alimentation directe par gravité.

**The Southern Martlet biplane (D.H. Gipsy II engine).**

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INCORPORATING AERONAUTICAL ENGINEERING
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# THE AEROPLANE

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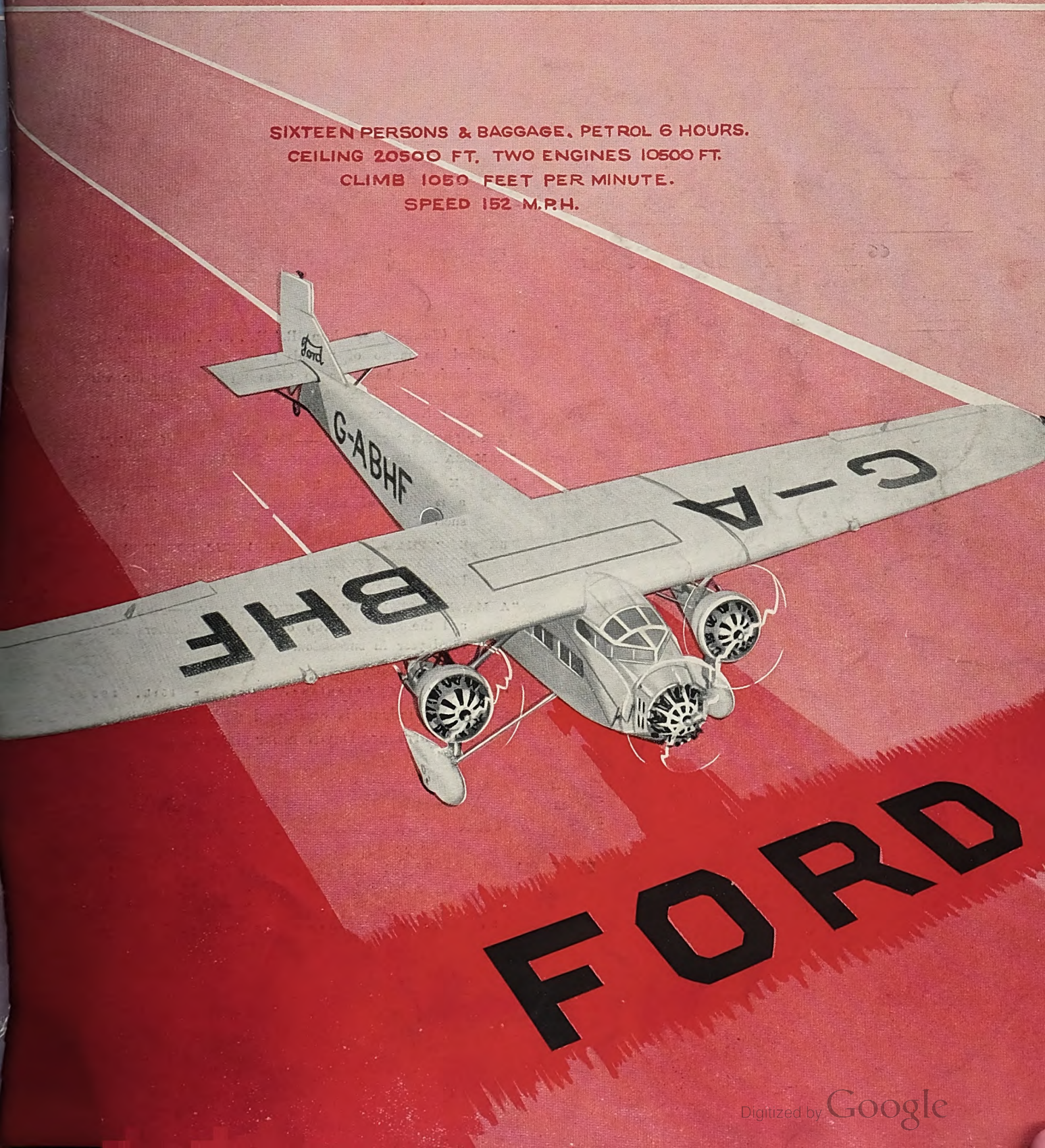


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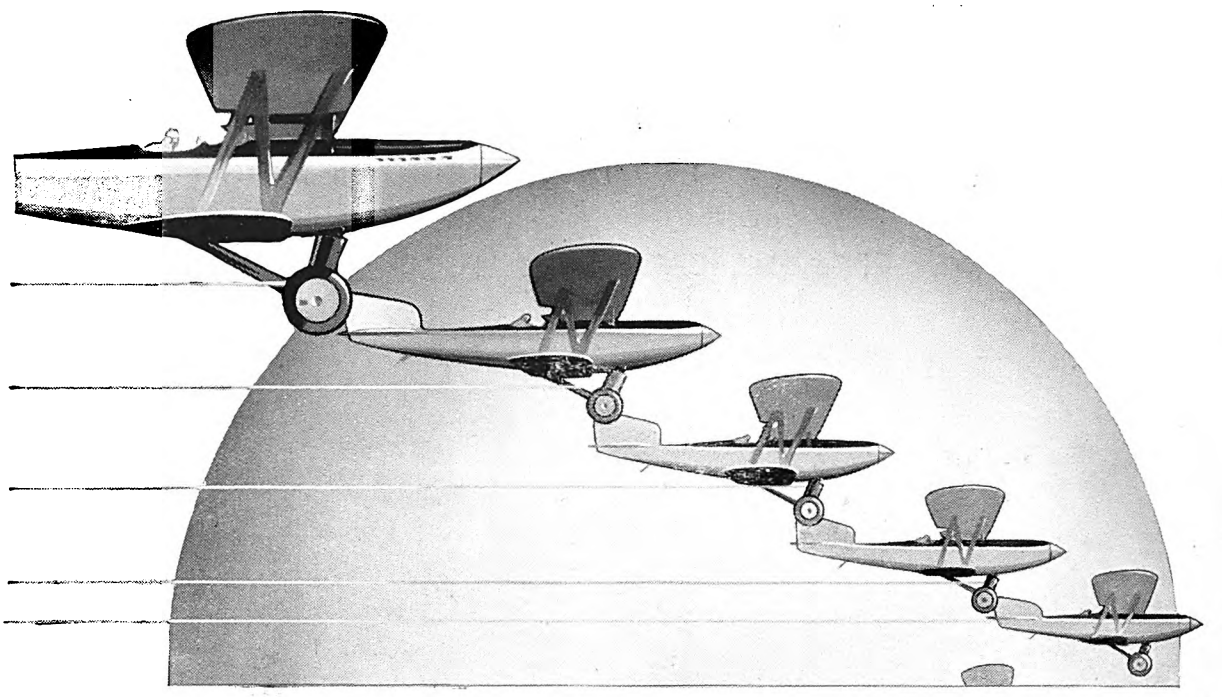
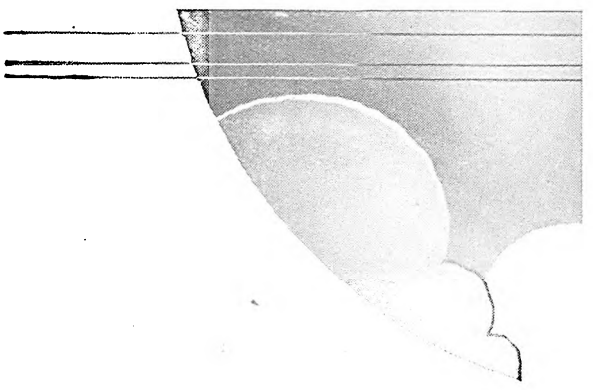


# "LEADING THE FIELD"



"No. 12 (Bomber) Squadron, R.A.F., . . . . . has more than justified its motto of "Leads the Field" this year. The Squadron's aim has been to clean up everything for which they competed and the following list of achievements shows how they have succeeded."

"AIR PILOTAGE EXERCISE——First in order of merit."

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## ON THREE BOOKS TO BE READ.

For the next few months most people have time to read. Even the keenest of sportsmen, whether hunting men or aviators, and the hardest of workers, whether manual or mental, find that during the long winter evenings, which to our ancestors meant a period of healthy hibernation, they have an inclination to slack off in the evening and do a bit of reading. And that reading may just as well be useful so long as it is entertaining. Therefore I recommend strongly three books which have been published recently,—to wit *Fights and Flights*, by Air Commodore Charles Rumney Samson, C.M.G., D.S.O., A.F.C., R.A.F. (retd.), *Scarlet and Khaki* by Wing Commander (Hon.) Thomas Bertrand Marson, M.B.E., R.A.F.O., and *Flying Corps Headquarters* 1914-1918, by Wing Commander (Hon.) The Honourable Maurice Baring, O.B.E., R.A.F.O.

These three books overlap one another in a curiously interesting way, and I give them in that order, because those who read them in that order will find that thus they will get the best picture of how things happened in that inter-tribal scrap which, though it all happened between twelve and sixteen years ago, is still miscalled the Great War, or the World War,—and in particular how they happened in those particular phases which are of the greatest interest to those of us who are concerned with flying.

Of course, they are all ancient history to the newest generation of aviators. We old-timers are apt to forget that public school boys who were too young to serve during that War are now beginning to think of themselves as middle-aged, and that there are thousands of fathers and mothers of families to-day who were still at prep. schools when the Armistice was signed, and that plenty of pilots in the R.A.F. and holders of "A" licences as civil pilots cannot remember anything about the War, because they were only between six and eight years old when it ended, and between two and four when it began.

Nevertheless, for that very reason these books should find thousands of readers. As a youngster between fifteen and twenty years of age, I was intensely interested in personal stories of the first Boer War, and of the Zulu War of 1879, which happened before I could read, though I remembered the pictures in the illustrated papers, such as the defence of Rorke's Drift and the saving of the colours at Isandlhwana, and in stories of Lord Roberts' march to Kandahar, and of the Russo-Turkish War before that. So, in spite of the young gentlemen who are not interested in history, and will suffer in due course for their ignorance, I believe that most youngsters to-day will be intensely interested in these books.

Also, hundreds of people who served in the War, whether in senior or junior ranks, will find these books equally interesting. In all of them the reader meets men who are now immensely senior officers, so exalted that the junior officer trembles at the knees in their presence, and reads of the quaint or gallant things which they did in their youth, fourteen or fifteen years ago. And even those of us who knew them well when the Flying Services were only beginning find in these books incidents in their careers during the War of which we never heard, and of which the heroes themselves have probably never told the whole story.

No three books could be less alike, and for that reason they are the more enlightening when read more or less consecutively. They should at any rate be read nearly enough together for the incidents in the first book to be clear in the reader's mind while he is reading the second, and so with the third.

### Fights and Flights.

Air Commodore Samson's book is pure fighting from beginning to end,—as those who served with him would expect. As the senior of the first three Naval officers who were allowed by Their Lordships of the Admiralty to learn to fly, he might have told wonderfully amusing and educative stories of those early days at Eastchurch. But he never mentions anything of his pioneer work, of which he has good right to be prouder than of anything else in his very distinguished career. And yet he shows his pride in those days, for he judges all the officers and men who served with him or under him in the War by the standard of the old Eastchurch crowd. Either they were worthy of Eastchurch or they were not. And no bad standard either.

I knew all those first Naval people very well, and no commanding officer could wish for a better crowd. On the other hand, no Naval unit ever had a better commanding officer. So honours were easy—in the Bridge sense. In the other sense honours were not easy to get under the command of "Sammy,"—as he was called unofficially by officers and men alike. Few commands had to work so hard for decorations during the War as had the people under him, but few commands won so high a percentage of decorations. The reason was quite simply that everybody was supposed to do what the Commanding Officer did, nobody was asked to do anything which the C.O. did not do, and the C.O. happened to be not only a thruster, but an unusually brave man.

The man who is not afraid is not brave. The truly brave man is he who is fully alive to his danger, and yet carries on with his job. And nobody understood more thoroughly the dangers of flying in peace or war than did Charles Samson. His officers and men knew it, and because of the way in which he led them they were ready to follow him anywhere.

There is no better example of his bravery than the act which resulted in his being invalided out of the Service a year or so ago. I had the story in a curiously roundabout way through the medical profession, and I have purposely avoided trying to get it confirmed through any Service channel, because of King's Regulations and such things, and if I had been told officially I should have been told in confidence, and could not have told the story here.

A certain type of aeroplane was said to be gassing its pilots. I believe certain unexplained fatal accidents had happened which indicated that the pilots were unconscious before the crash. At any rate, there were complaints of gas. So Air Commodore Samson took up one of these machines and flew it just so long as he could stand it. Consequently he was so badly gassed that he developed some internal trouble which very nearly killed him.

As the result he was invalided out of the R.A.F. Since then he has been living in the country with his beloved horses, hunting and steeplechasing, and now, his friends tell me, he is as fit as ever he was,—at which all who served with him will rejoice. That shows the manner of man he is. Before, during, and after the War he never let any of his people fly any type of aeroplane which he did not first fly himself to make sure that it was safe for others. And if a type was reputed to be dangerous he took still more care to try it out thoroughly.

### Criticism First.

Judged purely from the literary point of view, his book is bad. There is some execrable English in it,—mostly related to that "official jargon" to which the late Sir Walter Raleigh (the historian, not the pirate) was so rude. Air Commodore Samson seems to have read many official documents and reports, and little literature,—but he is at any rate free from the real mark of the beast, he does not write journalese. Also, he is very careless in the spelling of names. Sometimes he spells a name rightly in one place and wrongly in another. He is not perverse, like Lawrence in Arabia, who spelled a camel's name in three or four different ways

[*Fights and Flights*, by Air Commodore Charles Rumney Samson, C.M.G., D.S.O., A.F.C., R.A.F. 372+xii pp. 32 photographs. 3 maps.—Ernest Benn Ltd. 21s. net, or 21s. 6d. post free from THE AEROPLANE Book Dept.

*Scarlet and Khaki*, by T. B. Marson. Illustrated by G. D. Armour, 226 pp. 12 drawings. Jonathan Cape. 10s. 6d. net, or 10s. 9d. post free from THE AEROPLANE Book Dept.

*Flying Corps Headquarters* 1914-1918, by Maurice Baring. 313 pp.—Heinemann. 8s. 6d. net, or 8s. 9d. post free from THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, E.C.4.]

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and then told a protesting proof-reader that it did not matter because she was still the same camel, and a very good beast, too, but he has evidently taken the names from the notebooks or diaries which he kept during the War, and has not bothered to verify them.

Also, he says, or implies, so often, quite in polite language, that certain High Authorities were an incompetent crew, that some readers may regard him as a disappointed and disgruntled Naval Officer. Having known a good deal of the inside of nearly all the incidents to which Air Commodore Samson refers in such terms, I can not only confirm all he says but can go further and say that he has been surprisingly moderate in many of his expressed opinions. And being now a retired officer he is at liberty to say what he thinks.

### THE REAL THING.

In spite of all that the book gives the best picture of certain phases of the War that I have seen. It opens with a vivid account of the quaintly irregular scrapping in Belgium and French Flanders in the early days, when everybody at home thought the War would be over in a month, and the people at the front were beginning to see that it would last for years.

During those four or five months Commander Samson ran a most irregular force of aeroplanes and motor cars, the latter armoured and armed after a fashion devised by himself and his chief conspirators which would make the Tank Corps of to-day positively ill. But they were amazingly effective and did great execution. And the way he tells of their operations is genuinely amusing. His crowd ran the whole thing in a thoroughly sporting spirit, though they were in deadly earnest. Their night-bombing escapades would make a book by themselves.

People who went into the War later on, and think of war as an affair of trenches, and think of aeroplanes as real flying machines, will get quite a new view when they read of this guerilla business, with its constant movement and of the strange aeroplanes on which the early aviators flew. The mechanical heroes of this corner of the War, the lorry with the three-pounder gun, and the one Maurice Farman biplane which always flew when needed, are themselves worthy of an epic poem.

### THE DARDANELLES.

Thereafter Commander Samson was sent to the Dardanelles with a picked squadron and a lot of new aeroplanes, —mostly very bad French machines. This story is just as surprising as the other. How the young and inexperienced pilots performed was astonishing. The few of the old Eastchurch crowd who were allowed to go to the Dardanelles soon found the youngsters worthy of them. Here the reader comes across the names of men who have since become famous, though unless one knows just who they were they are often difficult to identify. The author might have put in a few footnotes to indicate what became of the more notable people who made their first steps on the road to glory under his leadership.

The description of the first landings at Cape Helles as seen from the air is very well done. There is no attempt at fine writing. Everything is described simply as it happened. And a very grim story it makes.

The rest of that section of the book which deals with the campaign in the Dardanelles gives a clear idea of the way in which the whole thing was muddled by incompetence on land and sea alike, and how a few competent officers and some thousands of very brave men managed to avoid a wholesale defeat. Also one has a pretty clear notion of the difficulty the R.N.A.S. had in getting the Navy to co-operate with aeroplanes as gun-spotters. Out of the whole Fleet one ship is singled out as taking an intelligent interest in observation from the air. Happily the Navy of to-day shows more intelligence.

Actually the most wonderful operations of the R.N.A.S. in those days were their long-distance bomb raids on railways and camps far away inland in the Balkans. And the photographs they took of their results were not less wonderful than the results themselves. Considering the unreliability of the motors, the inefficiency of the aeroplanes, the feebleness of the bombs, the absence of bomb-sights and the primitive state of cameras, the marvel is that they ever got anywhere, or did any damage or got any pictures.

As usual the Commanding Officer gives full marks to officers and men. Both were splendid. And how they did their work in the state of semi-starvation in which they lived on the dismal island of Tenedos passes comprehension.

### SEAGOING WAR.

After the evacuation of the Dardanelles, Captain Samson (promoted) took over the command of the old Isle-of-Man steamer *Ben-my-Chree* from Lieut. L'Estrange Malone, who after doing fine work in the War, foolishly became a convert to Bolshevism and was deprived of his Service

**THE BEGINNING OF THINGS.—Lieut. C. R. Samson, R.N., on one of the early Short biplanes at Eastchurch.**
*—(From a photograph lent by a brother officer.)*

rank, and still later turned from red to pink and became Labour M.P. for Northampton.

In the old *Ben* he patrolled the coasts of Palestine, and the Red Sea with such seaplanes as he could acquire, making himself a nuisance to the Turks with bombs and acquiring valuable information of troop movements. Again he accumulated round him an exceptionally fine crew, and their exploits are given full credit. How they did their work will be a useful lesson to young aviators of to-day whose ideas on aircraft carriers began with the *Furious* and the *Glorious*.

How would our modern pilots like to be lowered over-side in a float seaplane with the odds about 6 to 4 against its ever getting off the water, with a practical certainty that at least three cylinders would be misfiring before the end of a three-hour journey, and the knowledge that on an inland raid the Turks would sit on the mountains and fire *down* on it as it struggled up the passes to bomb the railway on the other side? Yet that was daily routine to the people in the *Ben-my-Chree*.

Finally the old ship was sunk by fire from Turkish field-guns. The story is truly pathetic, and everybody concerned felt the loss of the ship more than they cared to admit. After the War the ship was salved, and Air Commodore Samson saw her in Piraeus in 1922.

Thereafter Captain Samson went hunting for mine-laying submarines in the Indian Ocean. He tells little of these activities, there was no fighting so probably he was bored stiff. The only good story I ever met of that affair was the adventure of one Duncan Smith, which was elegantly told in an amended version by Rudyard Kipling. Smith and his observer were lost for about six months in the Maldive Islands, and were found just after they had succeeded in teaching the local island chief and his tribe to sing *How's your lady friend?* as their national anthem. But that is not in this book.

The story ends with a very brief account of the author's period of command at Yarmouth and Felixstowe. He implies gracefully that anyone who wants to know more of this period can learn all about it from Mr. C. F. Snowden Gamble's book *The Story of a North Sea Air Station*,—only he calls him Mr. V. Gamble,—which does not matter compared with the compliment to Mr. Gamble's book, which is certainly one of the best books ever produced on the seagoing side of the War.

Air Commodore Samson's account of his experiences in flying Sopwith Camels off lighters is well worth reading. His casual manner of describing a very fine feat is admirable, and so is the way in which he justly gives credit to

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Flt. Lieut. Culley for bringing down a Zeppelin off one of these lighters.

Whatever superior critics may say of the faults of the book it is very well worth reading. Air Commodore Samson's downright opinions and frank method of expressing them make the book worth a dozen of the wisely restrained kind. And the character of the man sticks out all over it. The key to him is found in his last sentence:—"I was lucky to have served with the very cream of the R.N.A.S., the finest service that ever was."

Well! We won't argue the respective merits of the R.N.A.S. and the R.F.C. I had plenty of friends in both. But at any rate we can agree that the R.N.A.S. was the finest seagoing service that ever was,—peace to its memory and to those who died in it.

### Khaki and Scarlet.

Wing Commander Marson's book ought to have been called *Memoirs of a Fox-Hunting Man,* if Mr. Siegfried Sassoon had not thought of it first. And T. B. Marson has the better right to the title because he is a born and bred fox-hunter whereas Mr. Sassoon became one by accident. Still, Mr. Sassoon's book is one of the most perfect gems in all English literature, so he may be forgiven. And *Scarlet and Khaki* can afford to be generous because it too is a gem in its way.

It is the simple story of an English country gentleman, born and brought up among sportsmen and thrown by chance into the greater affairs of the World. It is worthily illustrated by Mr. G. D. Armour, whose pictures have been a joy to readers of *Punch* so long as I can remember,—and that is a good while. If anybody knows of anybody else who can draw a real live hunter I should like to see his work.

T. B. Marson's stories of the Atherstone and Pytchley and Cottesmore countries before 1900 tell of a phase of English life which has passed. But it should be known to all who still hunt the fox.

As a very young man he went to the Boer War in the Yeomanry Cavalry, and that "sort of a war, My Lords" should also be known, especially to those who may within a few years have to fight a cavalry war at large over the plains of Central Europe, with aircraft as an added worry. Those who only knew that Captain Marson who was the sedate and diplomatic private secretary to the late Chief of the Air Staff will revel in his story of how he commandeered the General's horse at Fouriesburg—and put it back again.

After the Boer War the author returned to his fox-hunting again, and his stories of the period between the two wars are wholly admirable. The pity is that he did not write a whole book on fox-hunting, another on the Boer War, another on the early part of the War 1914-18, and another on his experiences with the R.F.C. and R.A.F. He has had plenty of experiences for all of them. And above and beyond all that, perhaps he may give us some day the inside history of the R.A.F.'s fight for existence from 1920 to 1930,—but that is another story.

Nevertheless the present book may serve a purpose which no other book could serve. It must of necessity be in every R.A.F. Mess for the sake of its stories of the Air Force, and there it may open up a new view of English life to lots of young men who have come into the R.A.F. with Short-Service Commissions from respectable families, but without the advantage of an upbringing in a public school or in a hunting country,—the two institutions which have done more than anything else to make England what it was in those happy days before politicians set about making it a country fit for heroes to live in, and made it impossible for anyone who is not a hero and a patriot.

### Palestine and Gallipoli.

On the outbreak of war in 1914, T. B. Marson joined the County of London Yeomanry as a trooper, and was soon given a commission. He served at first in the Suez Canal Zone, but in 1915 his regiment was sent to Gallipoli to serve as infantry. He suffered on the ground much of what Commander Samson saw from the air,—which is where the two books overlap in actual facts. The two points of view are unusually interesting.

After serving only a short time on Gallipoli Captain Marson was badly hit and lost a leg in the subsequent operation. He passes over the incident in a most curiously casual way, but hereabouts he shows the only touches of bitterness in a thoroughly cheery book.

Apropos an officer in the hospital ship on the way home, who talked like a veteran warrior though he had never been in a battle, the author remarks that he saw later that his officer has been awarded the D.S.O., and adds, "I trust the reward was obtained as a result of service and not merely conversation." And a little later, when as a convalescent he tried for a job in re-mounts and failed to get it, he says "that anyone who had been knocked out fighting should get into them was not to be imagined,"—which is the kind of thing which made us regret in those days that there was no English equivalent to the French word *Embusqué.*

In spite of his new tin leg (for which he gives full credit to Mr. Desoutter) Capt. Marson tried hard to get into the R.F.C., and succeeded in time to be appointed Recording Officer to No. 56 Squadron, which was then being formed at London Colney under Major Blomfield. Then the book becomes purely R.F.C. and R.A.F. And again the reader feels that there is not enough of it.

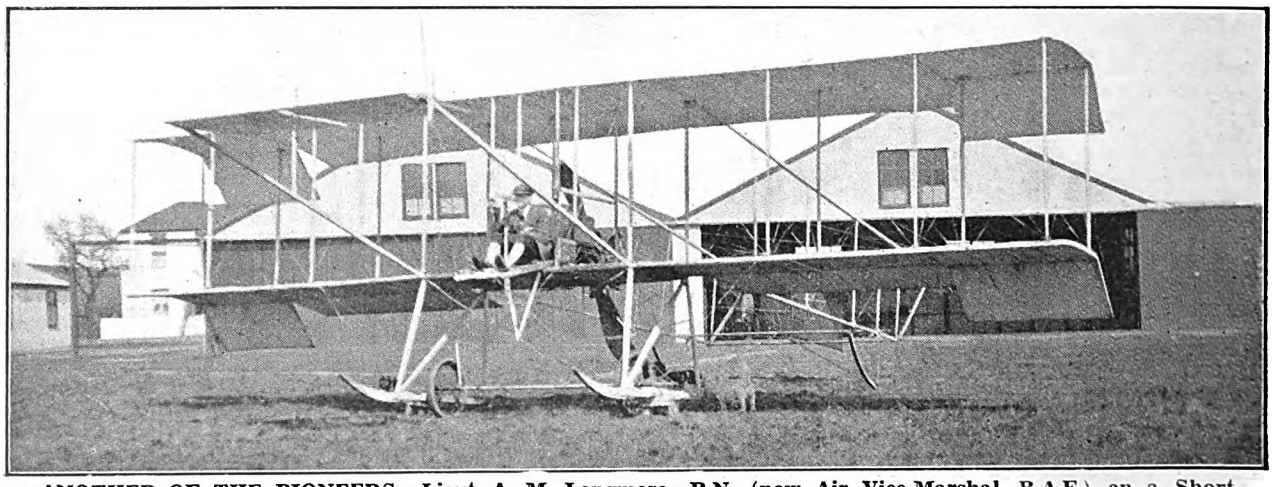
### The Story of No. 56 Squadron.

Nobody has written a history of No. 56. The nearest thing to it is the section of *Five Years in the R.F.C.,* by Major J. T. B. McCudden, V.C., which describes his period of service in that squadron. We may admit that McCudden's period was the climax of the squadron's story, but we should like to know more of its earlier and later days than has been told by either McCudden or Marson, and the latter might still do it, to the advantage of all concerned.

Nevertheless the description in this book gives a very good idea of the squadron before the McCudden period. The author has not had time or space in which to tell a fraction of the stories which might be told about the formation of the squadron. He mentions its famous band, but he does not tell how Major Blomfield formed it by the simple and wholly unconstitutional method of swopping air mechanics who were not musicians for others who were. If he heard of a carpenter-fiddler or a tinsmith-cornet-player in a squadron twenty, or fifty, miles away, off he would go in a tender complete with carpenter and tinsmith with all their kit, and back he would come with his musicians after a persuasive interview with their respective C.O.s.

No. 56 was our star squadron, the opposite number to von Richthofen's famous Circus and the pity is that though all the civilised world and the United States of America know all about the Circus, thanks chiefly to good publishing and publicity in America, even our own people know little enough about what was done by McCudden, Ball, Rhys-Davids, Hoidge, Maybery, Meintjes, Bowman, Maxwell and the rest.

Though the author has not given us a full history of the squadron he has at any rate given us a list of its battle honours, in the form of lists of enemy aeroplanes brought down by the various pilots, the honours and decorations



**ANOTHER OF THE PIONEERS.—Lieut. A. M. Longmore, R.N. (now Air Vice-Marshal, R.A.F.) on a Short biplane at Eastchurch in 1911.**

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won in the squadron, and the casualty lists,—which last make pretty grim reading, and ought to be useful to the young officers of to-day.

Marson has done yet another very good thing, not only for the squadron but for the R.A.F. as a whole. He has reproduced a number of Combat Reports, some of them in the form of narratives by the O.C. taken down from the pilots and other reports written by the pilots themselves. Thus he has preserved for the benefit of us all the personal accounts of combats by Ball, Meintjes, Crowe, Rhys-Davids, Prothero, Bowman, Maybery, and McCudden.

They are strongly recommended as an antidote to the slush that is published about our "heroic birdmen," or the drivel shown on the screen in *Hell's Angels* and such things. If the fatuous young fool who spent millions of dollars on *Hell's Angel's* had spent a few shillings on a few decent books in English, and a few pounds on getting one of the old R.F.C. people to edit his nonsense for him, he could have saved *himself* from being the laughing-stock of the British Empire while his hireling pilots and photographers win our unstinted admiration.

And likewise these combat reports, with their calm and concise descriptions of what happened ought to be a useful lesson to the ass who disfigured the recent reprint of Jimmy McCudden's splendid *Five Years in the R.F.C.* by calling it *Flying Fury*. If ever a fighting man fought without fury that man was McCudden. Read his reports and see.

After leaving No. 56, Capt. Marson was sent to America with Col. Blomfield on a special mission about the supply of machines, and his remarks on "the Land of the Fee and the Home of Behave" (as an American friend of mine calls it), are enlightening, and, as usual, too short.

True to his religion he ends the book with a chapter on fox-hunting, this time in the Scottish Border country.

One of the most entertaining things in the book is the story of how Major Maurice Baring used to punish Major-General Trenchard, G.O.C. R.F.C. in the Field, for unofficial misdemeanours for which King's Regulations do not provide. The offences ranged from being short-tempered on the telephone when talking to a junior officer all the way to bullying a whole squadron more than it deserved. And the punishments ranged from hiding the General's pipe to the extreme of breaking the window of the General's car so that he would have to sit in a draught. The punishment and the G.O.C.'s penitence were duly reported by telephone to the complainants.

I have never discovered whether the General knew of these conspiracies at the time, but I fancy he had a pretty shrewd suspicion that his beloved pipe did not lose itself. And nothing much could happen in the R.F.C. without his knowing it. He was more nearly omniscient than anybody I ever met in connection with flying.

FLYING CORPS HEADQUARTERS.

Which brings us naturally to Maurice Baring's book. Maurice himself is one of the great characters of history. I often wonder whether when he is dead somebody will write a complete history of him. It would be a fat book, and very entertaining. But the author would have to be a genius to do justice to all sides of his character. Marson describes him as "poet, writer, scholar, correspondent with various armies in numerous wars—in one war he had changed sides half-way through, giving as his reason that the side he was on was not sufficiently well fed—and a most accomplished linguist." Which is enough to go on with.

*Flying Corps Headquarters* appeared in 1920 with the title *R.F.C. H.Q.* Presumably that title is considered too cryptic in these days when war books are frightfully popular among a generation which knows not war or its system of nomenclature by initials.

When the book was first published, *The Nation* described it as "Sometimes irritating." So it is. But have you ever met anybody who was worth knowing who was not sometimes irritating. Maurice Baring has the quality of eternal youth. He celebrated his fiftieth birthday some years ago, but in some ways he is the youngest thing I know. And his youthful inconsequence and frivolity would naturally be irritating to the solemn *Nation*.

Yet that same quality often gives one the proper and sane outlook on big affairs. For example when he quotes from his diary as the notable events of one day that the battle of Neuve Chapelle started and that the rats had eaten his bath sponge a solemn reviewer might feel irritated. But those in fact *were* the great events of the day from the point of view of the man on the spot.

By dint of much artistic wangling, because he was unfit for general service, Maurice Baring joined the Staff of General Henderson, G.O.C., R.F.C., at St. Omer, very soon after war began. And when General Trenchard took over the command he remained with him. He made a special job for himself, as all successful men do, and became the General's tame memory and conscience, and various other useful qualities. Wherever the General went he went also, and the phrase "Make a note of it Baring" became a catch-word in the R.F.C.

This book tells just how the system worked, and shows the life of the squadrons in the field from points of view which are necessarily different from those in Marson's book. Also it gives the Flying Officer a picture of what he looks like to the Staff.

To anyone who has sense and sensibility the book is at once a literary joy and a very useful education. Only those who have done a course at the R.A.F. Staff College know what Staff Work really means. But anybody who reads Baring's book will get a good notion of why the Staff suffers as high a percentage of casualties from nervous breakdown as the squadrons do from enemy action.

To sum up the three books, Air Commodore Samson gives us a perfect picture of the born fighting man and leader of fighting men, Wing Commander Marson gives an equally good picture of a sportsman's part in the war, and Maurice Baring gives us the whole view of a philosopher and humorist who in some strange way has been cast by fate into many wars.

By the time one has read the three books one has not only acquired a complete knowledge of the War 1914-18 but one has acquired enough material to enable one to form a useful idea of the next war.

Maurice Baring quotes the maxim,—"We approach each war as novices." That is true, because the professional fighting man models his training on the experiences of the last war. Actually the next war always differs essentially from the last, and the proper way to use the experiences of the last war is to learn from it what to avoid instead of what to do.

Nevertheless there are certain essentials which do not change, because human nature does not change. All these books are full of human nature. And so those who read them will be much wiser men and much more valuable officers than those who do not. Even the mere civilian, male or female, will find them vastly entertaining, and will be the better for the knowledge of the heroism, the humour, and the utter futility which went to make up the War 1914-18.—C. G. G.

## CLAUDIUS REDIVIVUS.

[*Flying. An Epitome and a Forecast.* Claude Grahame-White. XI +263 pp. 40 Illustrations. Index. Chatto and Windus. 12s. 6d., or post free 13s. from THE AEROPLANE Book Department.]

To the post-war aviator the name of Claude Grahame-White does not mean a great deal, but those of us who have been in the game for some years can well remember when Mr. Grahame-White was what might well be called the idol of the man (or woman) in the street, for he was a clever and neat pilot, and did what he could to make a name for British Aviation as well as himself. In which ambition he succeeded very well, with the help of that able promoter and propagandist the late Richard T. Gates, assisted by Mr. Bernard Isaac.

This is by no means the first book which Mr. Grahame-White has produced, but, in the opinion of the present reviewer, it is certainly his best—indeed, the all-round interest of the book provided a welcome surprise. The literary style suggests that the author has read a good deal since the last book under his name appeared, and the contents suggest that he has been quite closely in touch with the progress of aviation for some time. Mr. Grahame-White has certainly done something to supply the need for general knowledge among those who are becoming airminded.

In the first part he has given a history of early aeronautics, which, in the main, seems to be accurate, although he would have added to the value of this portion of the volume if he had stated the sources of his information. The illustrations are not particularly good, and better ones could certainly have been obtained. The sections dealing with "First Engine-Driven Flights" and "Cross-Channel and Other Pioneer Flights" are quite interesting, and although not much of the information contained therein is original, nevertheless, it is very useful to have it condensed in so compact a form. Portions of these chapters are slightly egotistical, but presumably it is a little difficult to avoid such a defect in a book of this character.

The reviewer thinks that Mr. Grahame-White would have been wiser to have omitted the chapter dealing with "The War." It is far too short to be of any value, and it is not free from mistakes, as, for example, when he states that the German Air Services had approximately 600 aircraft at the outbreak of War—a figure which is nearly three times in excess of the actual one according to German official records.

He makes some pungent criticisms of what he considers to be the comparative failure of successive Governments in this country to develop civil air lines; but his patent solution, to provide "such sum as £10,000,000 a year allocated to the institution of an Empire-wide programme," seems perilously near being ridiculous to anybody who knows modern aviation and its capabilities. Such expenditure would merely cover the Empire with quantities of aeroplanes which could not earn their keep. The only way to produce commercial aeroplanes is to make them earn their keep as the only alternative to starving.

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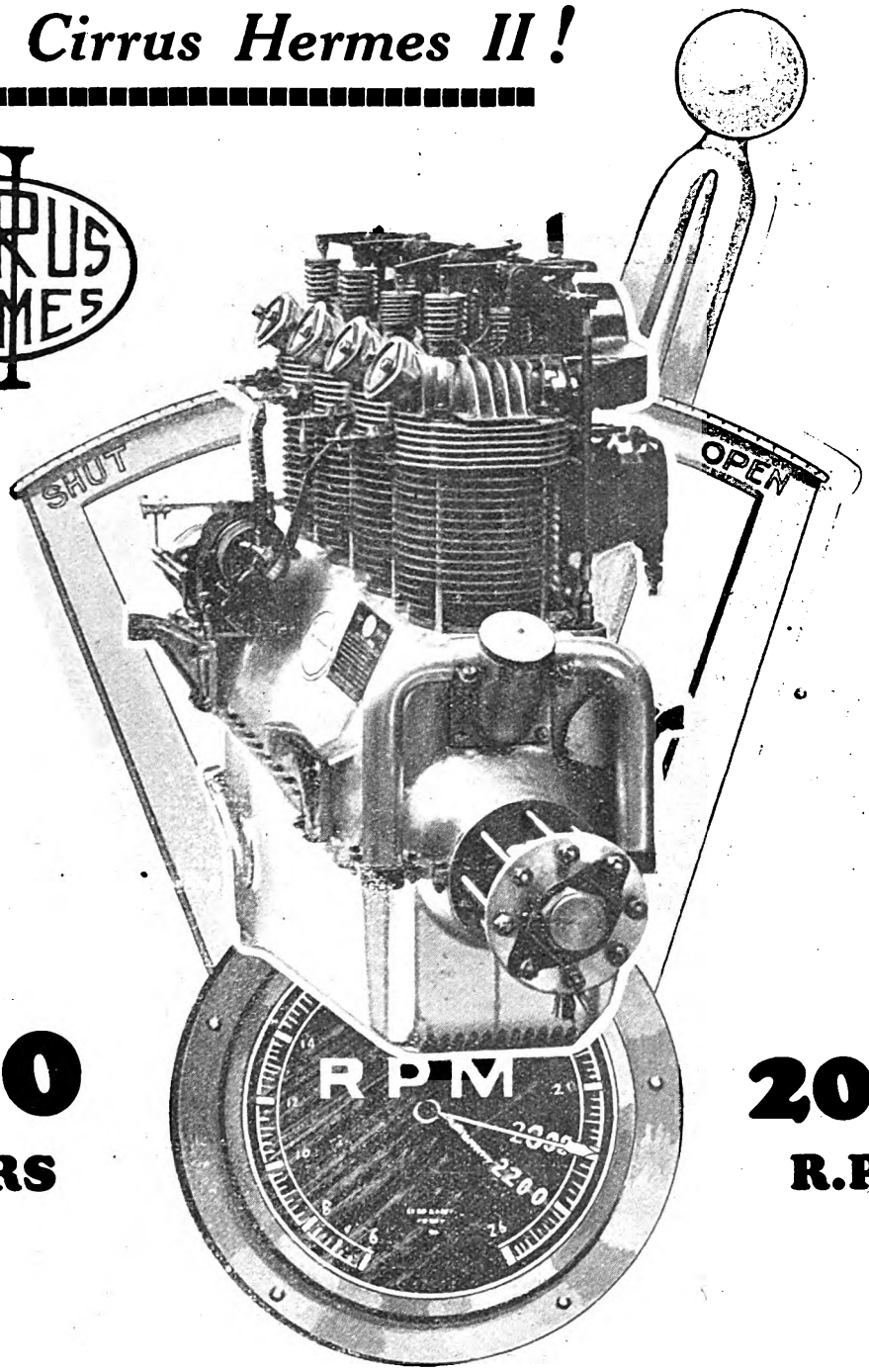


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In his chapter dealing with "Aeroplane Design," he makes some wholly admirable suggestions, for he holds that until aircraft designers are able to design machines which will combine a long range with high speed and big paying load, and until aircraft operating companies are able to ensure (along with designers) that the accommodation in their machines does not compare unfavourably with ocean-going liners, then, and not till then, will civil aviation pay. These may seem platitudes, but the truth in them is real and pressing.

Mr. Grahame-White criticises the airship programme, and, in doing so, he is commendably free from fanaticism, especially when he holds that there is no real future for airships. To sum up, Mr. Grahame-White has written a book which, although not entirely free from blemishes, is quite interesting and deserves to be widely read by those who have little knowledge of aviation and wish to acquire some.—G. A. G.

## TOO MUCH OF A FEAST.

[*Aviation of To-day. Its History and Development.* J. L. Nayler and E. Ower. With a Chapter on Aircraft Engines by W. J. Stern, and a Foreword by Lieut.-Col. Mervyn O'Gorman. xix+491 pp. 48 Coloured Plates. 113 Photographic Reproductions. 47 Sectional Charts. Diagrams and Maps. Frederick Warne and Co. 15s. Or post free 15s. 6d. from The Aeroplane Book Department.]

The book of Mr. Nayler and Mr. Ower is more ambitious, and, although at first sight it appears to be an extremely attractive little volume, and although it undoubtedly contains a very great deal of information, it would have been better if more care had been expended in its compilation; for, in their desire "to get everything in," the book gives an impression of raggedness.

They deserve congratulation on their attempt to embrace the whole field of the history, development and practice of aeronautics; but it is quite impossible to achieve all this within the limits of a comparatively small volume,—so the information is, in many places, distressingly meagre. Notable exceptions to this ruling are the chapters dealing with the principles of flight, and with aircraft engines. Despite its faults (and in many places, its mistakes) the book is certainly valuable, for it is better to err on the score of zeal than otherwise, and in any future edition to the book it could doubtless be improved.

One of the most interesting aspects of this fat little volume is the system of illustration; but, here again, the desire to cover the whole field has led the authors into trouble; as, for example, on one side of a page there is a coloured illustration of a Montgolfier balloon, and on the other, a "Boeing night mail plane." On another is a picture of Sir Alan Cobham alighting on the Thames after his flight to and from Australia and on the reverse is a coloured picture of the replica of Stringfellow's model. The authors may, however, not have been free agents in this matter, for the Publishers have an American connexion, and the inhabitants of the United States of America always seem to delight in flooding their books with unnecessary and incongruous illustrations.

The shape of the book is awkward. It was evidently intended to be a handy pocket size, but the authors in the fulness of their hearts, and minds, have put so much into it that only the pocket of a confirmed poacher could accommodate it in comfort. All the same, it is a book worth having.—G. A. G.

## THE SMALLER FRY.

[*Light Aero Engines,* by C. F. Caunter. 277 pages, 7½ ins.× 5 ins. Many illustrations, diagrams, tables and bibliography. Sir Isaac Pitman and Sons, Ltd. From The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4, 12s. 9d., post free.]

Mr. Caunter is thoroughly conversant with light aeroplane engines, their construction, characteristics and their history. The historical notes with which he prefaces his accounts of modern developments are most interesting, and drive forcibly home the fact that pioneers derived no profit and little credit from attempts which definitely paved the way for our advantage to-day. As a general treatise on modern light aero-engine practice his book is interesting and enlightening, but its main fault is that it seems to fall between two stools.

Mr. Caunter deals with engines up to 150 h.p., with general consideration of their class, size, power, achievements and progress. Constructional and detail design are treated with special reference to various specific makes of engine and under divisions for the separate components which are common to all engines. Oiling, carburettors, magnetos, superchargers and gearing are likewise described with actual examples.

Separate chapters are then devoted to horizontally-opposed, vertical and radial engines of the better-known types, with general specifications and descriptions of each.

The chapter of two-cycle designs for light aero-engines is particularly interesting in view of Mr. Caunter's experience in this field. His own engine is explained, and the principles involved are interesting enough to make a more extended treatment worth while. The Diesel types are discussed but not very exhaustively.

The final chapter on maintenance is no doubt sound enough as far as it goes, but it is of limited interest to any but those who intend to do some overhauling, and then the maker's handbook is a much fuller guide.

In fact that chapter rather illustrates the chief fault of Mr. Caunter's book. It is hardly categorical enough for the seeker after particular facts about particular engines, and was probably never intended to supplant the literature of the individual manufacturers; but if it was designed to appeal to the more casual student it contains too much specific information and not enough of that speculation on future development which Mr. Caunter is evidently qualified to undertake.

As the poppet-valved, electrically-ignited petrol engine nears the end of its tether the traits of two-stroke and compression-ignition engines are of increasing interest; and so is the sleeve valve. Mr. Caunter knows his subject and has written an instructive book, but whether he is not practical enough or insufficiently visionary, depends upon his reader. He may be a little disappointing to both.—F. D. B.

## PEDESTRIAN AERONAUTICS.

[*Imperial Air Routes.* Major A. E. W. Salt. With an Introduction by Air Vice-Marshal Sir Sefton Brancker. xiv + 280 pp. 7 illustrations. Bibliography. Index. John Murray. The Aeroplane Book Dept., 6s. 3d. post free.]

This is a disappointing book, for the author had a unique opportunity of writing a book which would be both interesting and valuable, and instead, he has given us a dull and pedestrian piece of work which consists mainly of ill-digested facts. Indeed, the best part of the book is the Foreword by the late Sir Sefton Brancker,—but then, he was an enthusiast and had the gift of instilling his enthusiasm into his audience—a gift which Major Salt sadly lacks.

Let not the reviewer be misunderstood. The author has given in this book a great deal of valuable and needed information about the establishment of Imperial air routes, but he has completely failed to convey anything of the romantic side of the business, and he has shown himself to be unacquainted with the knowledge of the actual mechanism of writing a book, in that he has loaded his pages with matter which should have been put in footnotes or appendices; in short, the book may be described as a work of reference—no more and no less. For some curious reason he has included a chapter on "The Pleasure and Pains of Flight," which is irrelevant to the theme. So also are many of the books mentioned in the bibliography.—S. G.

## A FIRST AID TO KNOWLEDGE.

People in aviation are always being asked questions by people outside of aviation about whether learning to fly is worth their while, or whether there is much difficulty in learning to fly, or how they can learn to fly, or where they can learn to fly, or what is the cost of learning to fly, or how long they are likely to take to learn to fly, or how the flying clubs operate, or where the flying clubs are in relation to their own homes, or what an aeroplane costs to keep, and so-forth and so-on.

The cheapest way of answering all these questions is to send the inquirer a copy of "The Broad Skyway," or to advise the inquirer to buy a copy for himself or herself. The book only costs 2s. 6d. It answers all those questions in detail. It illustrates every type of British light aeroplane existing at the present moment. And it gives all the general information that can be wanted by anybody who is just becoming interested in flying but has not yet reached the stage of wanting to buy technical literature. Any bookseller can get the book if he will take the trouble, or it can be had for 2s. 8d. post free from The Aeroplane Book Department, Cannon House, Pilgrim Street, London, E.C.4.

## AIRWORTHINESS.

In the House of Commons on Nov. 12, in reply to a question by Capt. Macdonald, the Under Secretary of State for Air said that cases of wing, aileron, or tail flutter had been reported in different types of aircraft, mostly experimental, from time to time. If such flutter had been proved to be incurable the type had not been adopted for Service or civil use. One obsolescent type of Service aircraft which was potentially liable to flutter at extreme speeds was permitted to be flown only at speeds at which flutter did not in fact occur. No flutter was known to occur in any aircraft now holding a British certificate of airworthiness.

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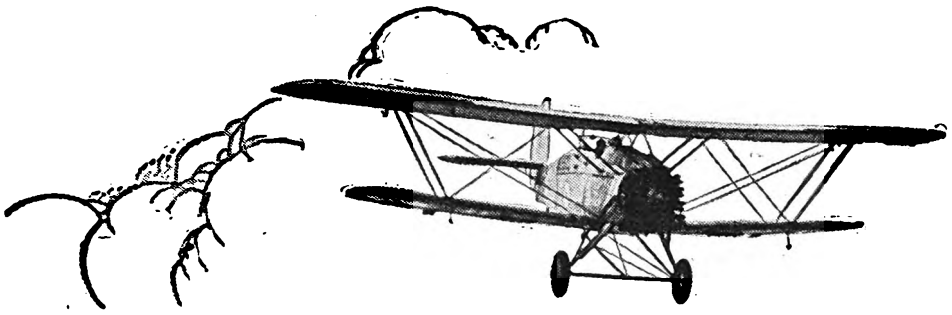

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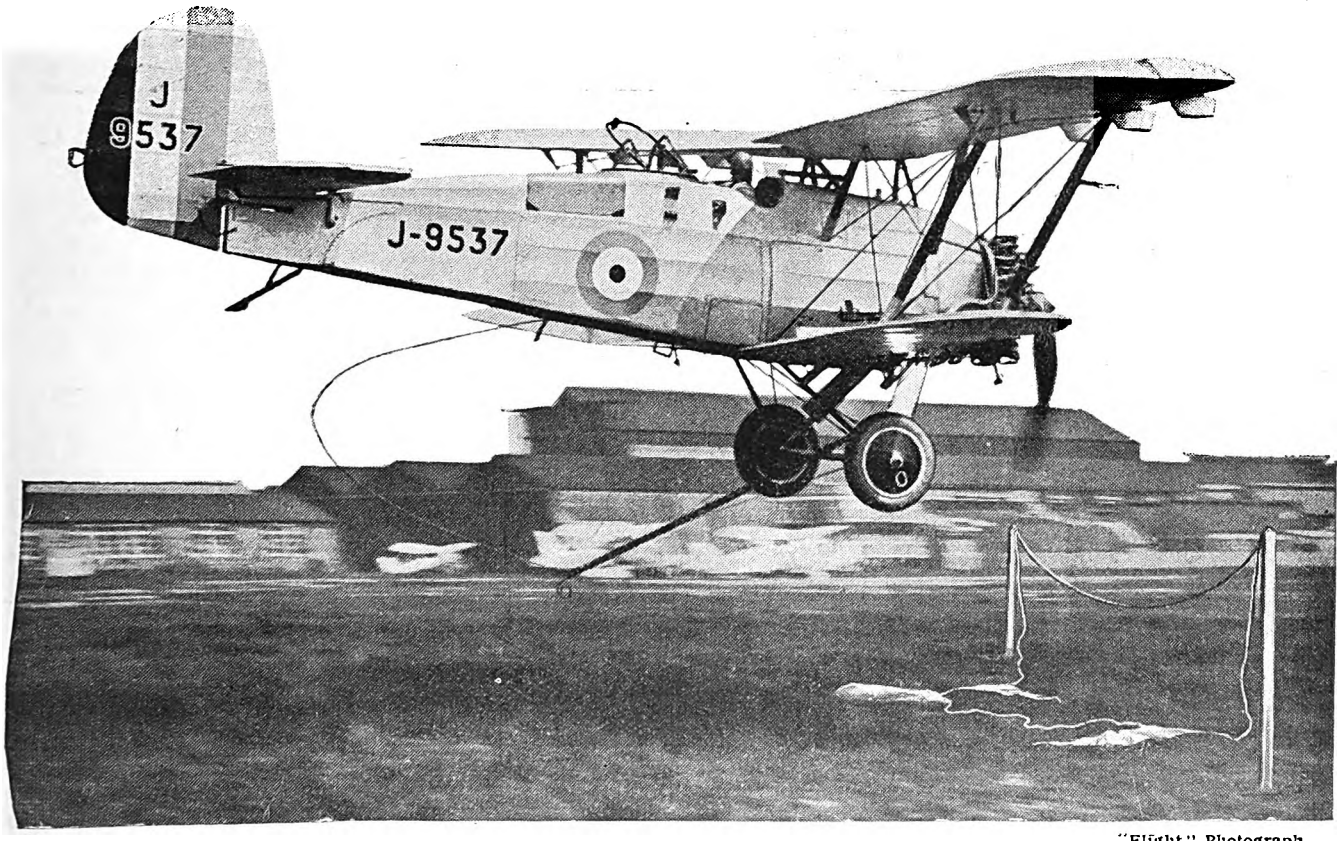


"Flight" Photograph.

The Atlas Picking Up Messages.



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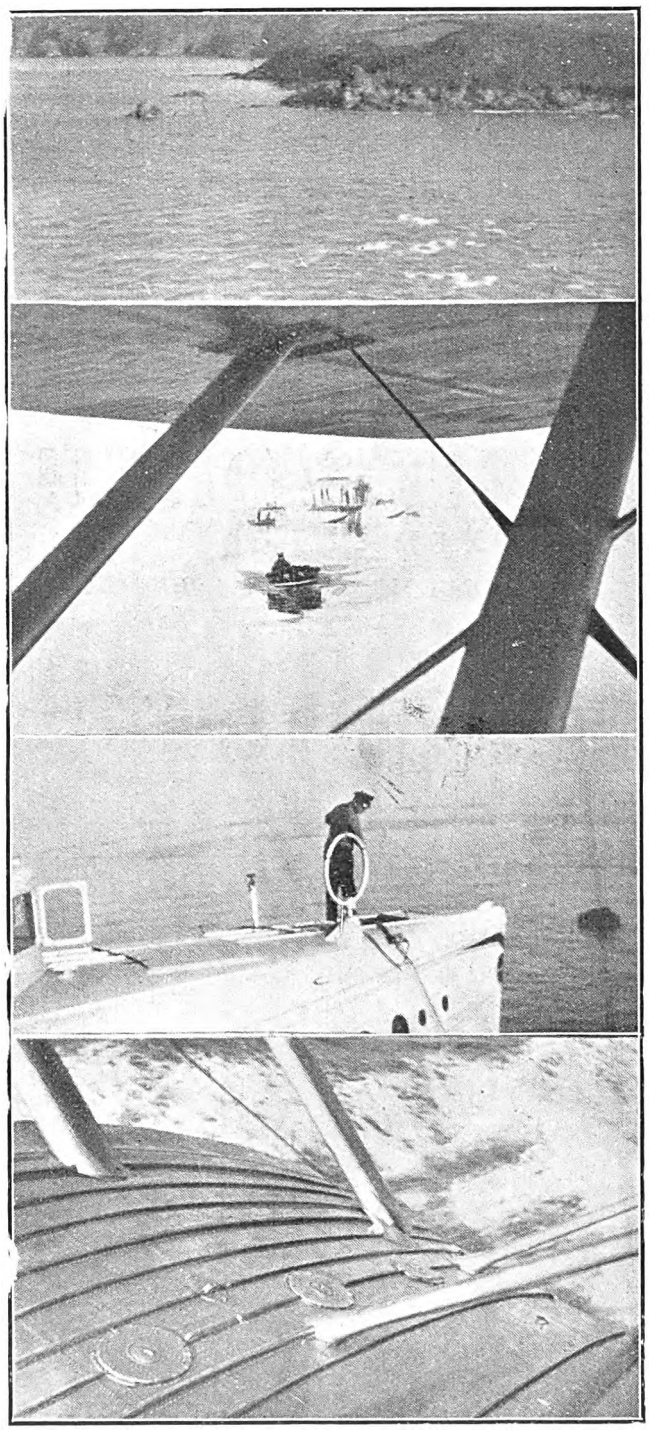
## A LONG PORTUGUESE FLIGHT.

The two Portuguese officers who started on Nov. 1 to fly from Lisbon to Goa in a Puss-Moth reached their destination on Nov. 19. They were forced down by weather at Seville on the first day and delayed until Nov. 4. On that day they flew from Seville to Tunis, and in the two days following reached Benghazi and Aboukir respectively.

After news of their arrival at Cairo on Nov. 7 nothing further was heard until Nov. 17, when they arrived at Karachi. From there they flew to Diu, a Portuguese island off the Kathiwar Peninsula, and thence to Goa. Altogether it was a very fine performance, after such an unfortunate beginning.

## A FRENCHWOMAN SETS OUT.

On Nov. 12 Mlle. Maryse Hilsz set out alone in a Morane Gipsy-Moth from Paris to Saigon. She reached Marignane the same day. On Nov. 13 she went on to Gorizia, and to Belgrade the day after. The next stage was Constantinople, and on Nov. 16 she reached Konia, Asia Minor.



**ON BOARD THE DO.X.—Some photographs taken by Col. The Master of Sempill. From the top—(1) Passing the Channel Islands. (2) Looking out of the cabin window at Calshot. (3) The wireless direction-finding ring. (4) The wave behind the stub wing when taxying.**

## MRS. BRUCE IN JAPAN.

Mrs. Victor Bruce, flying a Bluebird (Gipsy II), landed at Osaka, Japan, on Nov. 21. She was reported in THE AEROPLANE of Nov. 19 to have reached Seoul, Korea, after a 600-mile flight along the Yellow Sea. On the following Friday she set off to cross the Korea Strait to Japan, and made the landfall after a flight of about 500 miles in seven hours.

According to Press reports, Mrs. Bruce is considering a continuation of her flight, probably round the World, with the exception of certain notable bodies of water.

Mrs. Bruce was welcomed enthusiastically in Tokio by English residents and Japanese alike. The Press, which is always well-informed about Mrs. Bruce, has it that she intends to take her Bluebird by boat to Vancouver, fly thence mysteriously to Indiana to visit her mother, who is living there, and so to New York. After a visit North to Quebec she intends to follow the East Coast southward to British Guiana. She will then fly to Buenos Aires, ship her equipment to Cape Town, and fly back to England.

## A FORTY-MINUTE FAILURE.

MM. Boussoutrot and Rossi, who were still in the air near Oran when THE AEROPLANE went to press for Nov. 19, landed without officially beating the World's record, although their flight of 67 hours and 33 minutes was 20 minutes longer than that of Maddalena and Ceccione. By F.A.I. ruling, the endurance record must be eclipsed by a full hour to establish a new one, so Italy still holds the official mark.

The descent of the French machine was due to a lack of oil induced by over-consumption, and there still remained 700 of the 5,900 litres of petrol with which they took off.

The Blériot 110 *grand raid* monoplane is built entirely of wood, even to the wing and fuselage coverings. The engine is a 600 h.p. Hispano-Suiza, and the total loaded weight at the take-off was about 7½ tons, of which 5½ tons was petrol.

Incidentally, the crew flew every night without any lights, except from the presumably luminous instruments, because their generator failed the first evening.

## THE PROGRESS OF THE Do.X.

On Nov. 20 the Do.X left Bordeaux and alighted in Santander harbour. Capt. Christiansen decided not to go on to Ferrol because of strong head-winds. The flying-boat proceeded to Ferrol the following day, and on Nov. 23 flew from Ferrol to Coruña in 2½ hours.

According to the daily Press a report is current that the Do.X will not go to the United States because of delays and the lateness of the season. She will probably visit the Canaries or the Azores before returning to her base. Which is exactly what THE AEROPLANE said three or four weeks ago.

## AFTER MANY HOURS.

Some months ago consternation was caused in Milan by the unauthorised descent from above of anti-Fascist leaflets. The offending aeroplane and its pilot were ineffectively chased by two military machines, and a few hours later the news came that an aeroplane had crashed near St. Gothard and injured its pilot, Signor Luigi Bassanesi.

After several months in hospital Signor Bassanesi came to trial before the Federal Court of Switzerland at Lugano, charged with flying over Switzerland without a proper licence, and also with flying over the forbidden area of the St. Gothard forts. Four other accused, whom he refused to implicate, were tried with him.

On Nov. 22 Signor Bassanesi was sentenced to four months' imprisonment and a fine of 200 Swiss francs on the above charges. His aeroplane—a borrowed one—had previously been seized, and his alleged accomplices were acquitted.

## MAJOR FRANCO TAKES LEAVE.

Several months ago, Major Juan Franco, of the Spanish *Aeronautica Militar*, was imprisoned for a breach of discipline and declarations of Republican principles. He was made known to the World in 1926 when he flew from Spain to Buenos Aires across the South Atlantic in a Dornier Wal, with two Napier Lion engines. He later made another attempt to fly the South Atlantic from Cartagena in a Spanish seaplane. He and his crew were rescued by H.M. Aircraft Carrier *Eagle*, about 100 miles from the Azores after having been missing for a week. The officers of the R.A.F. who discovered him were decorated by the Spanish Government as a reward for finding him. And the casting into jail of the rescued hero shortly afterwards gives one to doubt whether his return was as welcome as those rewards would indicate.

On Nov. 24 Major Franco left the prison by way of the chapel window from which he had filed a bar. With him went another prisoner, Commandante Reyes, accused of embezzlement.

According to reports the confinement of the prisoners was mild, as is usual with officers, and their escape is equivalent to a breaking of parole. The decision of the authorities to remove Major Franco to the military fortress of Pamplona, where his quarters would be less comfortable and his privileges fewer, may have influenced him to regain his liberty, but there seems to be no reason, other than sensation-seeking, why he should not have walked through the door.

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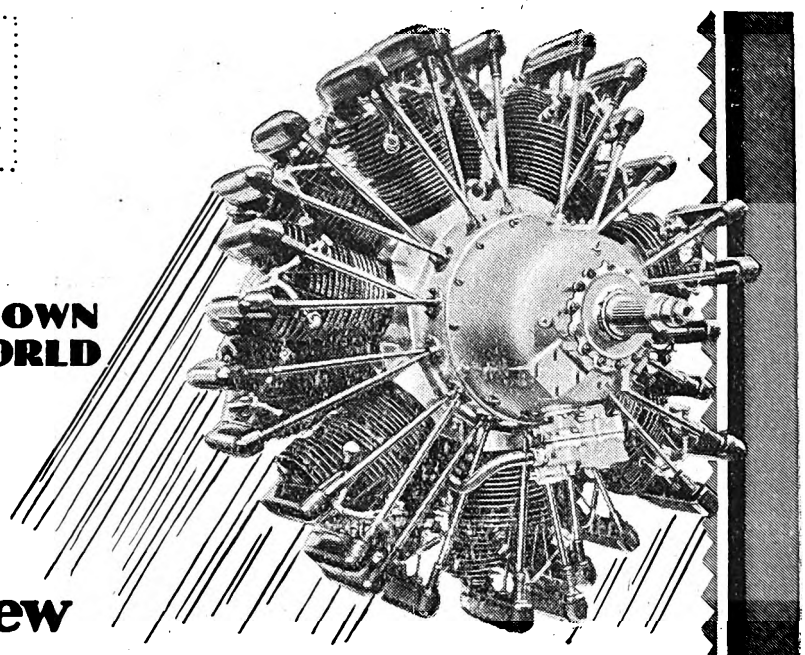

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## THE LEAGUE OF NATIONS AND CIVIL AIRCRAFT.

On Nov. 24 the Preparatory Disarmament Commission of the League of Nations resumed its consideration of the Articles of the Draft Convention dealing with publicity concerning armed forces on land, sea, and in the air. This information is embodied in the Armament Year Book which is published annually by The League of Nations.

The Italian delegate proposed the addition of a table showing the armed forces and the formations organised on a military basis stationed in territories overseas. This was adopted by five votes to four after the Italian delegate had agreed to limit his proposal, in view of the mobility of naval and air forces, to land forces. The British delegate did not vote, and the French delegate voted against the proposal.

With regard to annual statements to be made concerning numbers and horse-power of aircraft and numbers, horse-power and volume of airships, the British delegation submitted a new text providing for a return within three months of the close of the budgetary year.

The Italian and French delegations withdrew their own text in favour of the British text, which was adopted by seventeen votes to one, the one dissentient being Germany.

Thereafter there was much discussion of the Article concerning publicity in Civil Aviation. The British delegate, Lord Cecil, said that there was no doubt of the possibility of using most civil aeroplanes for offensive purposes, but as it was impossible to limit civil aviation it was very necessary to have complete information on the subject.

An Italian delegate referred to an account given in a Spanish newspaper in which a member of the crew of the Junkers G-38, which has been doing a tour of Europe, is reported to have said that it was capable of being rapidly converted to carry four guns of small calibre and several machine-guns, and that it could carry five tons of bombs and drop them over a large radius without alighting and could fly fully loaded at a height of 19,000 ft. The Dornier Do.X was also brought into the argument.

The German delegate countered these statements by referring to quotations from the French *Journal Officiel* in which an expert had said that it would be foolish to weaken civil aeroplanes built in time of peace while they had full liberty to build bombing machines. The transformation of civil aeroplanes into military aeroplanes was not an economical proposition, as the transformation resulted in the production of a machine lacking all the attributes of an efficient military aeroplane. The German delegate said he could not agree to this extension of the Convention but he would be glad if all countries would publish annual statements of their Civil Aviation.

The value of the discussion was largely destroyed by the arguments advanced by the Italian delegate concerning the German G.38 and the Dornier Do.X. Neither of these machines would be of the least use as military aircraft in the manner suggested To quote the words alleged to have been given by a member of the crew of the G-38 to a Spanish journalist to a body like the League of Nations seems particularly futile.

The status of the member of the crew is unknown but the journalist was probably obsessed by the present unruly state of certain parties in Spain and was only capable of thinking in terms of offensiveness.

The members of the Preparatory Disarmament Commission are no doubt most estimable diplomatists, but their names are unknown, as, what our own Press would call, "Air Experts." One feels that they would be as likely to to swallow stories of Crosse and Blackwell aircraft and Maypole engines as were some of the expert intelligence people of our late enemies during the War 1914-18.

However, as the Italian Government has bought two Dornier Do.Xs and one Junkers G-38 it will be in a position to give expert advice on their qualifications as war aeroplanes to their Delegation to the League of Nations in due course.

## TRUE RECIPROCITY.

The one thing which makes visits to foreign countries unpleasant for British Aviation people is the fact that we are all always so hospitably received and so generously entertained wherever we go that we feel that when foreigners visit us we do not return their hospitality adequately. Therefore the thanks of the Aeronautical Community are due to the Viscountess Elibank for having formed what she is pleased to call the British Aviation Hospitality Association. The object of the Association is to entertain distinguished visitors from foreign countries. The names of those generous people who provide it with funds are not disclosed, but their generosity is made all the greater by the fact that they prefer to remain anonymous. And the existence of that Association will at any rate ease the consciences of British aeronautical visitors abroad.

The first manifestation of the Association's hospitality on a large scale was given on Nov. 20, when the British Aviation Hospitality Association gave a Lunch at the International Sportsmen's Club, in Grosvenor House, to the delegates of the International Commission for Air Navigation, who have been in London discussing the international problems of airworthiness in relation to aircraft materials.

The International Commission for Air Navigation, or I.C.A.N., as it is commonly called, deals with all the great problems of air navigation, and it has a sub-commission for operations and materials, inside which is still another sub-commission which deals with materials in relation to airworthiness. Our recent visitors were those representing this particular sub-section of the I.C.A.N.

After lunch Lady Elibank, who was in the Chair, gave the Toast of The King, and thereafter expressed the pleasure of the British Aviation Hospitality Association at having the opportunity of entertaining so many distinguished guests who were gathered together to help the progress of International Aviation.

Air Vice-Marshal T. I. Webb-Bowen, C.B., C.M.G., who was deputising for Air Chief-Marshal Sir John Salmond, who was prevented from attending by an urgent Service matter, proposed the Toast of The Delegates. He emphasised the growing importance of air transport to the World and the importance of a friendly international understanding on all matters pertaining thereto, and he said how pleased we all were to welcome so many distinguished visitors on this occasion.

In reply, General Sabatier, the senior French delegate, said that the delegates were very sensible of this hospitality offered to them. They appreciated immensely having this opportunity of meeting so many ladies who had distinguished themselves in flying all over the World and those who showed their keen interest in aviation.

He referred in touching terms to the late Air Vice-Marshal Sir Sefton Brancker, who, he said, was the best friend international aviation had ever had. Sir Sefton was welcomed wherever he went all over Europe and the delegates felt his loss the more acutely when in going to their meetings they entered the building (Gwydyr House), where he had for so long done such valuable work.

General Sabatier referred to the difficulty of regulating safety in flying and the need for international goodwill in reaching international agreement on so many differing points. He expressed on behalf of the delegates their appreciation of the cordiality and hospitality with which they were received everywhere by everybody in this country.

M. Roper, Secretary-General of the I.C.A.N., then proceeded to translate General Sabatier's speech into English in his own masterly way. He turned into perfect rhetorical English the elegant phrases of General Sabatier without missing a point or an inflection. M. Roper then expressed on behalf of the delegates their thanks to Lady Elibank for the hospitality extended to them.

Lastly, a special word of praise must be given to Mrs. R. R. Bentley, who acts as Secretary of the Association, for the excellence of her staff work.

Those present were:—M. Allard, Major Buchanan, Miss Islay Balfour, Commander Sir Dennistoun Burney, Lady Burney, Mr. Burkett, Mrs. R. R. Bentley, Lt.-Col. Bitossi, Sir Alan Cobham, General Caddell, Lady Mary Crichton-Stuart, Air Vice-Marshal Dowding, Viscountess Elibank, Count de Gallah, Mr. C. G. Grey, Air Commodore Holt, Mr. H. B. Howard, Mr. Jenkin, Miss Amy Johnson, Squadron Leader Kubita, Lady Melchett, Cav. Magaldi, Mr. Ian Murray, Lt.-Col. Nerincx, Miss Rosalind Norman, Lt.-Col. Outram, Mr. and Mrs. Handley Page, The Hon. Aline Partington, M. Roper, Sir Alliott Verdon Roe, Col. the Master of Sempill, M. l'Inspecteur Général Sabatier, M. l'Ingénieur Stocés, Sq. Ldr. Shearer, Lt. de Vaisseau A. Sala, Lord Herbert Scott, Sir Campbell Stuart, the Dowager Lady Swaythling, Lt.-Col. Thwaites, Air Vice-Marshal Webb-Bowen, Sq. Ldr. Wilkes, Dr. E. B. Wolff, The Hon. Mrs. Williamson.

## NATIONAL FLYING SERVICES.

In the House of Commons on Nov. 17, in reply to a question by Capt. Balfour, the Under-Secretary of State for Air said that the advance, at interest, of money to National Flying Services Ltd. had been made by the Air Ministry in order to assist the company while they were arranging to obtain the further capital which the result of the initial year's trading showed to be necessary. The company had agreed to recovery being made by the Air Ministry through the withholding of payments in respect of licence grants as earned, and had further undertaken to give to the Air Ministry a floating charge on all its assets to the extent of the loan outstanding, such charge to rank immediately behind that already given to the Debenture holders. The company having obtained further capital, had decided to repay the advance in full, and the cheque sent for this purpose had been received by the Air Ministry.

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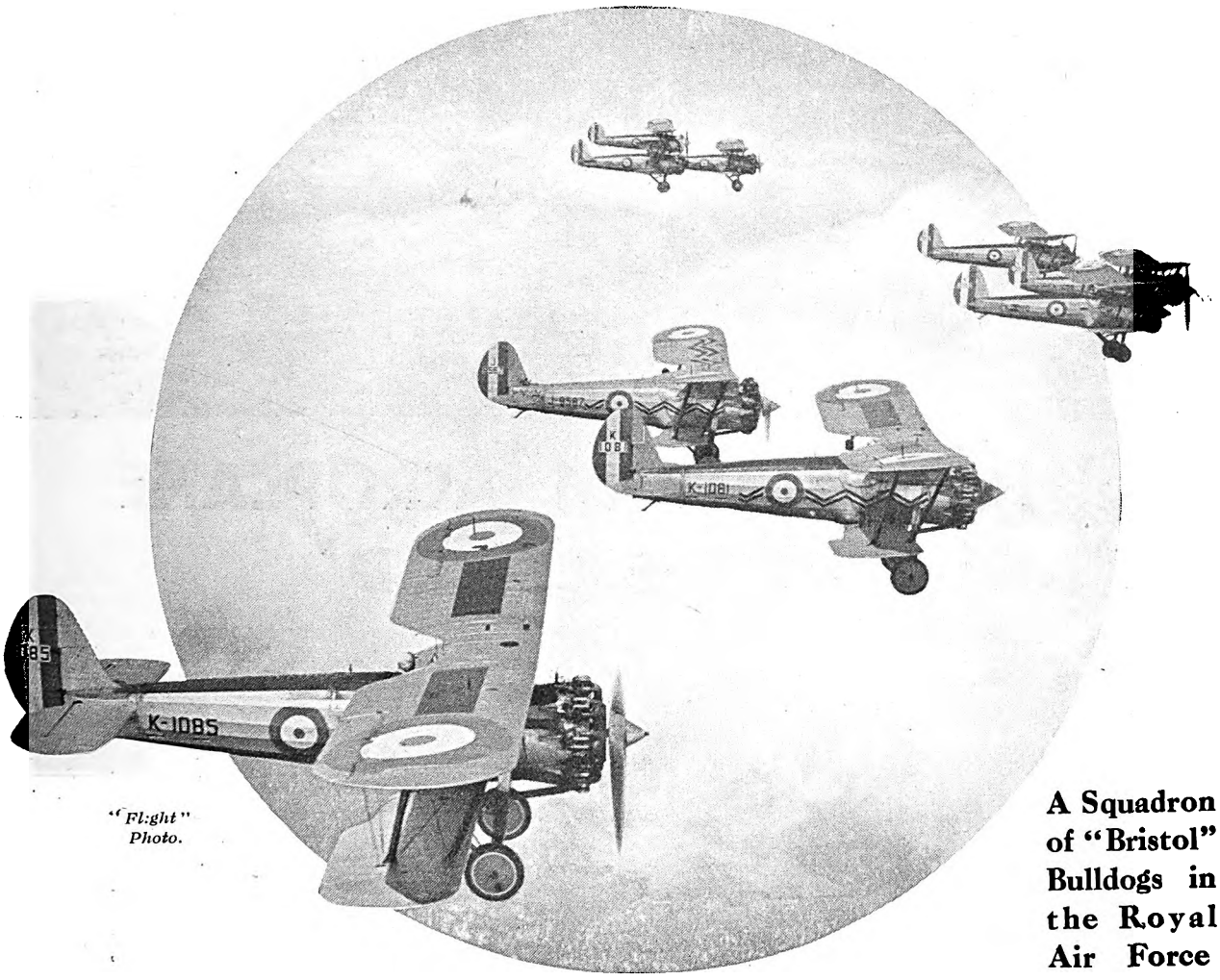
# "Bristol"




"Flight" Photo.

A Squadron of "Bristol" Bulldogs in the Royal Air Force

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## PARIS AERO EXHIBITION

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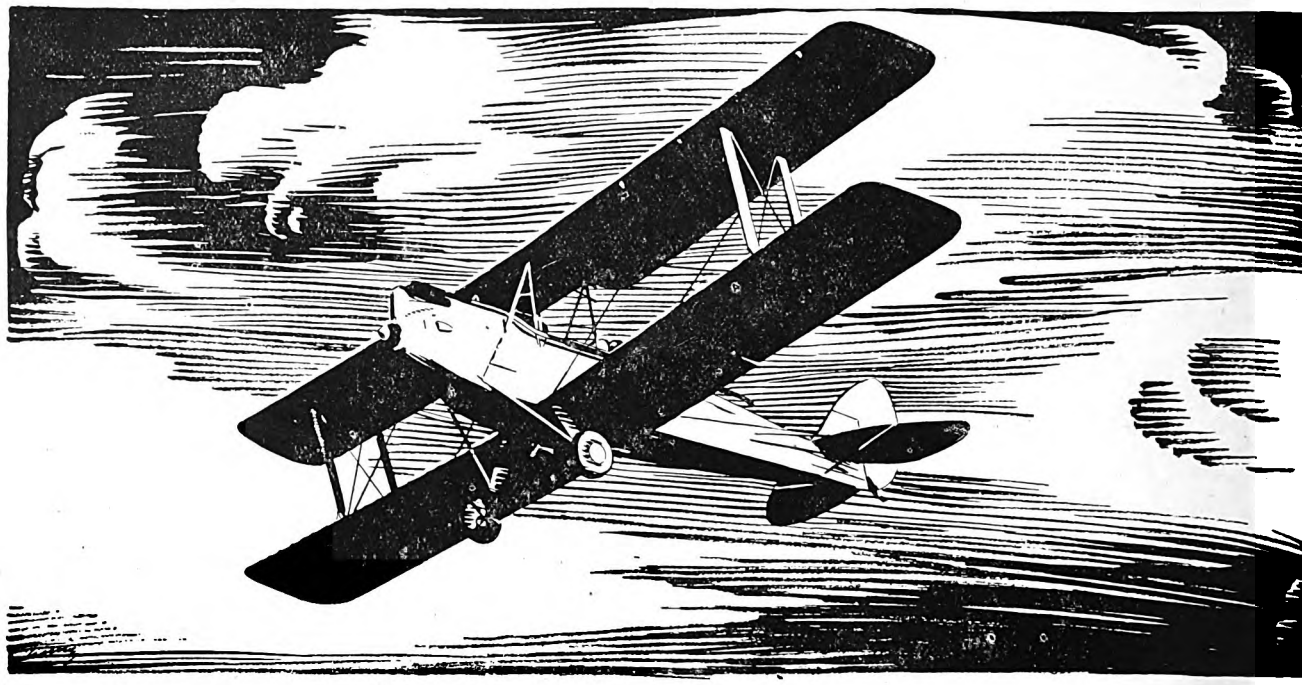

# "THE BEST LIGHT AEROPLANE IN THE WORLD"

THE Moth, powered with the 100 h.p. Gipsy I or the 120 h.p. Gipsy II engine, both of de Havilland manufacture, is the most widely used of all light aeroplanes to-day.

Originally marketed six years ago as the "all-purpose" light aeroplane, hundreds of Moths have flown millions of miles in the performance of such varying duties as Service training, communication and practice flying; private touring, aerial survey and mail carrying; flying club and school instruction; taxi and air-line work; commercial purposes of all sorts, and a host of other duties in every corner of the globe.

The Moth has to its credit more competition successes, pioneer flights and other notable achievements than any other light aeroplane in existence.

To-day the Moth is used by:
The British Royal Air Force.
The Royal Australian Air Force.
The Royal Canadian Air Force.
The South African Air Force.
The Irish Free State Army Air Corps.
The New Zealand Ministry of Defence.
The Chilean Military Air Force.
The Italian Royal Air Force.
The Danish Royal Air Force and Naval Air Service.
The Greek Naval Air Service.
The Spanish Royal Air Force.
The Portuguese Air Ministry (Naval Section).
The Jugo-Slav Ministry of War and Marine.
The Roumanian Ministry of War.
The Norwegian Ministry of Defence.

By the Governments of: India, Sweden, Finland, Japan, Poland, France, Italy, China, etc.

At the majority of Flying Clubs and Schools in: Great Britain, Australia, Canada, India, South Africa, Kenya, Sweden, Poland, Singapore, Switzerland, Spain, New Zealand, Finland, Colombia, Jugo-Slavia, Austria, China, Portugal, Ireland, Dutch East Indies.

For Private and Commercial Flying in all the above countries and: Argentina, Brazil, United States of America, Germany, Straits Settlements, Nigeria, Tanganyika, The Bahamas, Rhodesia, New Guinea, Belgium, Peru, Mexico, Jamaica, Fiji, etc.

A Moth will be on view on Stand No. 2, Main Aisle, at the Paris Salon, Nov. 28th–Dec. 14th.

## THE DE HAVILLAND AIRCRAFT CO LTD

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# The GIPSY MOTH



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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, November 18.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Lt.-Cdr. S. Richardson, R.N., is reattached to the R.A.F. as a Flt. Lt. with effect from Sept. 17, and with seniority of July 1, 1927.

The following Plt. Offs. are promoted to the rank of Flg. Off.:—R. P. Cauthery, H. M. B. Collins, C. E. Hartley, P. B. Lusk (Oct. 2); E. H. Coleman, G. Farnhill, J. E. Loverseed, E. J. K. Megaw, M. E. M. Perkins, R. Todd, F. Whittingham, D. H. G. Wood (Oct. 13); H. C. Singleton (Oct. 14).

Sq. Ldr. A. C. Collier ceases to be seconded for duty with the Estonian Government (Sept. 5);

Sq. Ldr. E. D. Atkinson, D.F.C., A.F.C., is placed on the half-pay list, scale A (Oct. 1); Flg. Off. F. Fazey is placed on the retired list on account of ill-health (Nov. 15); Flt. Lt. H. F. Jenkins is transferred to the Reserve, Class A (Nov. 7); Flt. Lt. Russell Wykeham Morgan Hall resigns his S.S. Comn. (Nov. 14); the S.S. Comn. of Plt. Off. on probation Richard Ruston is terminated on cessation of duty (Nov. 18).

MEDICAL BRANCH.—The following Flt. Lts. are transferred to the Reserve, Class D (ii) (Nov. 15); M. Clancy, L.R.C.P. and S., C. P. O'Toole, L.R.C.P. and S.

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Flg. Off. J. F. A. Baker is transferred from Class C to Class A (Sept. 27); Plt. Off. C. Bland is transferred from Class AA (ii) to Class C (Nov. 14); Flt. Lt. C. H. N. Nunn relinquishes his comn. on completion of service (Nov. 10).

ACCOUNTANT BRANCH.—Flg. Off. H. Hedderwick relinquishes his comn. on completion of service (Sept. 30).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—Flg. Off. D. H. Back is transferred to No. 604 (County of Middlesex) (Bomber) Squadron (May 1).

## Appointments.

*Week ending November 24.*

GENERAL DUTIES BRANCH.—Air Vice-Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Establishment, 18/10.

Group Captain H. M. Cave-Browne-Cave, D.S.O., D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Establishment, 17/10.

Wing Commander B. L. Huskisson, D.S.C., to R.A.F. Depot, Uxbridge, on transfer to Home Establishment, 8/11.

Squadron Leaders L. H. Slatter, O.B.E., D.S.O., D.F.C., to No. 43 Sqdn., Tangmere, 13/11. E. D. Atkinson, D.F.C., A.F.C., to Half-pay List, 1/10. C. N. Lowe, M.C., D.F.C., to No. 2 F.T.S., Digby, 18/11.

Flight Lieutenants S. M. Park, to Stores and Supply Depot, Aden, 15/11. G. H. Harrison, to No. 8 Sqdn., Aden, 15/11. C. T. Walkington, to No. 47 Sqdn., Khartum, 15/11. C. W. Harrison, to Royal Airship Works, Cardington, 21/11. C. W. Hill, to Half-pay List, 11/11. W. F. Dry, to R.A.F. Depot, Uxbridge, 15/11.

Flying Officers A. B. Smith, M.C., C. D. G. Welch, L. S. T. Brown, W. J. Pickard, E. F. Wain, H. S. Martin, all to R.A.F. Depot, Uxbridge, 15/10. L. H. Anness, A.F.C., to E. and W. School, Cranwell, 11/11. T. L. Harrison, to No. 55 Sqdn., 'Iraq, 21/10. L. E. A. Wright, to No. 58 Sqdn., Worthy Down, 13/11. P. S. Cook, to R.A.F. Depot, Uxbridge, 1/11. R. R. Bennett, to No. 26 Sqdn., Catterick, 19/11. R. Jones, to No. 6 Sqdn., Ismailia, 15/11. S. H. C. Gray, to Aircraft Depot, Karachi, 28/10. J. C. Cunningham, to No. 5 Sqdn., Quetta, 28/10. W. P. J. Thomson, to Aircraft Park, Lahore, 28/10. R. R. Frith, to R.A.F. Base, Gosport, 13/11. C. R. J. Hawkins, to Superintendent of R.A.F. Reserve, Hendon, 12/11. J. S. Tanner, to R.A.F. Base, Gosport, 13/11.

Pilot Officers W. F. Hilchie, to No. 5 F.T.S., Sealand, 4/10. D. E. Milson, to No. 25 Sqdn., Hawkinge, 10/11.

MEDICAL BRANCH.—Squadron Leader T. J. Thomas, to Station H.Q., Heliopolis, 11/10.

STORES BRANCH.—Flight Lieutenant R. H. Latham, to No. 23 Group H.Q., Grantham, 10/11.

Flying Officer A. E. Evans, D.F.C., to R.A.F. Depot, Uxbridge, 2/10.

## A Fatal Accident.

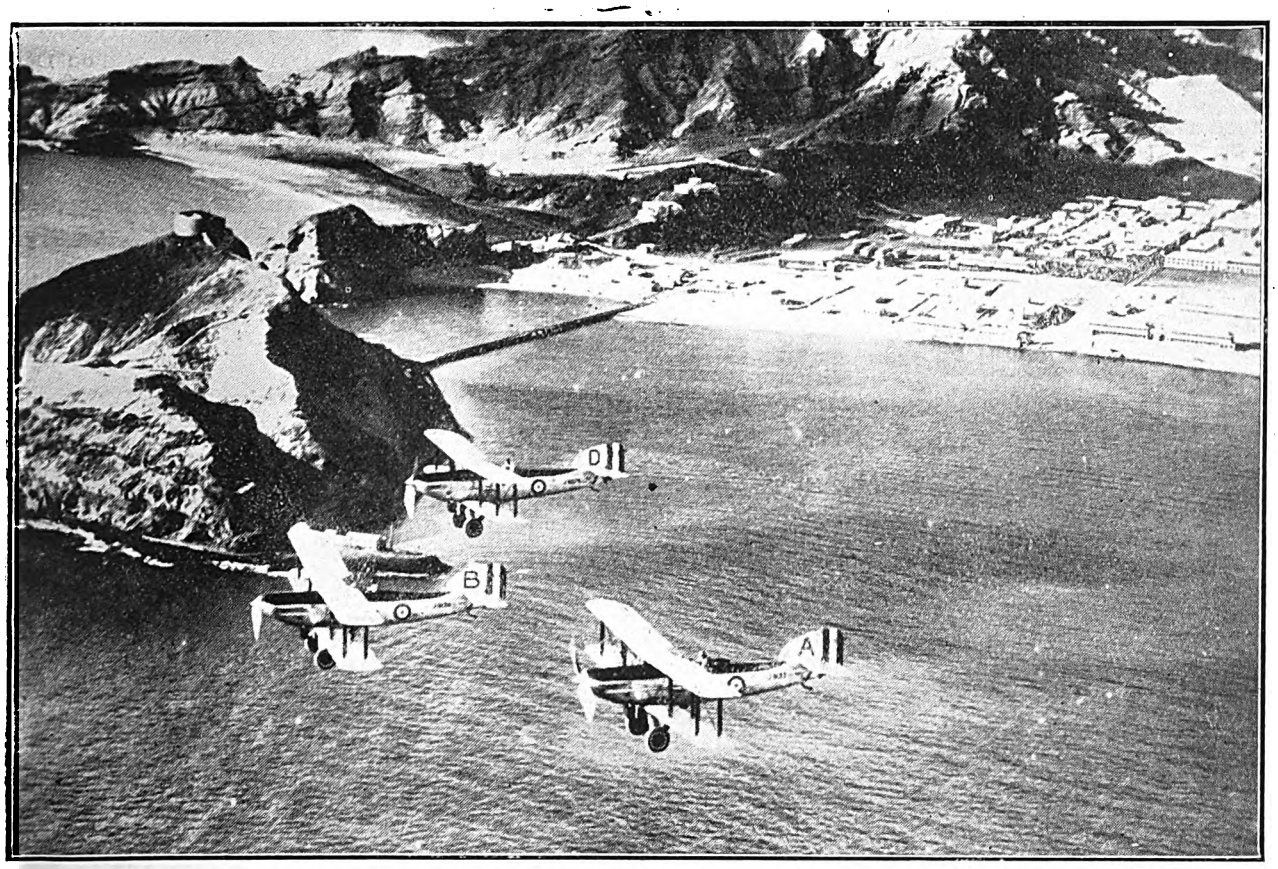
The Air Ministry regrets to announce that as the result of an accident at Catterick to an Atlas aircraft of No. 26 (Army Co-operation) Squadron, Catterick, on Nov. 19, Pilot Officer John Anthony Chance, the pilot of the aircraft, was killed and No. 156231 Serjeant Adam Maitland, was seriously injured.

## An Award for Gallantry.

Air Ministry Weekly Orders announce that the late No. 364367 AC.1. Charles Samuel Wiltshire, of No. 11 (Bomber) Squadron, R.A.F., Risalpur, was promoted to the rank of Corporal with effect from May 17, 1930, in recognition of distinguished service rendered by him in the Field on that date.

Corporal Wiltshire's gallant action was described in a message from the Lahore correspondent of *The Times* which was reproduced in THE AEROPLANE of May 28 as follows:—

Flying Officer Stroud had been bombing hostile tribesmen and came down to 600 feet so that Aircraftman Wiltshire, his observer, might use the machine-gun. While flying at this height Flying Officer Stroud




ROYAL AIR FORCE CONTROL.—A flight of No. 8 (Bomber) Squadron, R.A.F., whose work in the defence of the Aden Protectorate was described in "The Aeroplane" last week in the report of a lecture at the Royal United Service Institution.—(*R.A.F. Official photograph.*)

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was hit by a bullet from the ground which lodged in his neck. He signalled to Wiltshire to take control and then died.

Wiltshire, who had had no experience of flying, fitted in a spare lever in the control column in the back seat, turned the machine, and made for the emergency landing ground 45 miles away. He succeeded in reaching his objective, but from lack of experience landed too fast and crashed. He died in hospital the same night.

Wiltshire could have jumped with a parachute, but, no doubt thinking that the pilot was still alive, chose the hazardous course of returning to the aerodrome.

### The West African Flight.

The West African Flight, R.A.F. which is on its return journey from Bathurst to Khartum, arrived at Kano on Nov. 22 and at Geneina on Nov. 23.

The Flight arrived at El Fashir on Nov. 24 and left for El Obeid on the following day.

The Flight, under Sq. Ldr. E. L. Howard-Williams, left Khartum on Oct. 14, arrived at Bathurst on Nov. 3, and began the return journey on Nov. 10.

### Aerobatic Restrictions.

An amendment to King's Regulations and Air Council Instructions, para 717 forbids outside looping, in which the pilot is on the outside of the circle instead of being on the inside as in ordinary looping, and "bunting," which consists of half an outside loop followed by a half roll, on any type of aircraft unless specially authorised by the Air Ministry.

### Short-Service Officers.

In the House of Commons on Nov. 19 in reply to a question by Capt. Balfour, the Under Secretary of State for Air said that twenty-seven short-service commission officers had been granted permanent commissions in the General Duties Branch, R.A.F. during the year ending Oct. 31, 1930, and the number of officers holding short-service commissions on that date was 837.

### Number of Personnel in the R.A.F.

In the House of Commons on Nov. 19 in reply to a question by Mr. Thomas Lewis, Mr. Whiteley (for the Under Secretary of State for Air) said that the number of the personnel of the R.A.F. (exclusive of those serving in India) from 1926 was as follows:—

1926,—30,640. 1927,—28,139. 1928,—28,888. 1929,—29,240. 1930,—32,000.

### The R.A.F. Display 1931.

The Twelfth Annual Display of Flying by the Royal Air Force will be held on Saturday, June 27 at Hendon.

Air Commodore B. C. H. Drew, the Secretary of the R.A.F. Display, in a circular letter in which he asks everyone interested in flying to make a note of this date, states that the attendance in 1930 surpassed all previous years. The number of people admitted to the aerodrome was 154,120 and the number of cars in the official car parks was 10,837.

[Truly we are not a warlike nation.—Ed.]

### R.A.F. Dress Regulations.

The first amendment list to Air Publication 1358, *Dress Regulations for Officers of the R.A.F.*, has now been published and contains a complete list of the order in which orders, decorations, and medals should be worn.

A concession to comfort (or efficiency) is made in an amendment to the regulations governing the occasions on which various dresses may be worn. Trousers instead of breeches may now be worn as working dress within the unit, and on flying duties except on occasions when it is necessary to attend a ceremonial parade at the end of a journey.

The illustrations of the new Greatcoat seem to indicate that skirts will be worn longer and fuller in 1931.

### Special Assessments.

The following airman has been awarded a Distinguished Pass on completion of a course of *ab initio* flying training at No. 1 Flying Training School, R.A.F., and a notation has been made accordingly in his official record:—A-Serjeant J. H. Maddern.

The following officers and airmen have been awarded Distinguished Passes on completion of a course of *ab initio* flying training at No. 3 Flying Training School, R.A.F. and notations have been made accordingly in their official records. Pilot Officers:—E. Dawson, C. H. Williams, J. N. Baxter, M. Q. Candler, V. A. Dawson. Serjeants:—J. H. Craigie, R. G. Setchell, R. H. Little.

### Parachutes.

In the House of Commons on Nov. 19 in reply to a question by Capt. Balfour, Mr. Whiteley (for the Under Secretary of State for Air) said that parachutes had now either been issued or were on order for all sea-going aircraft in the R.A.F. except for one type which was obsolescent.

[The new type is described on p. 1262.—Ed.]

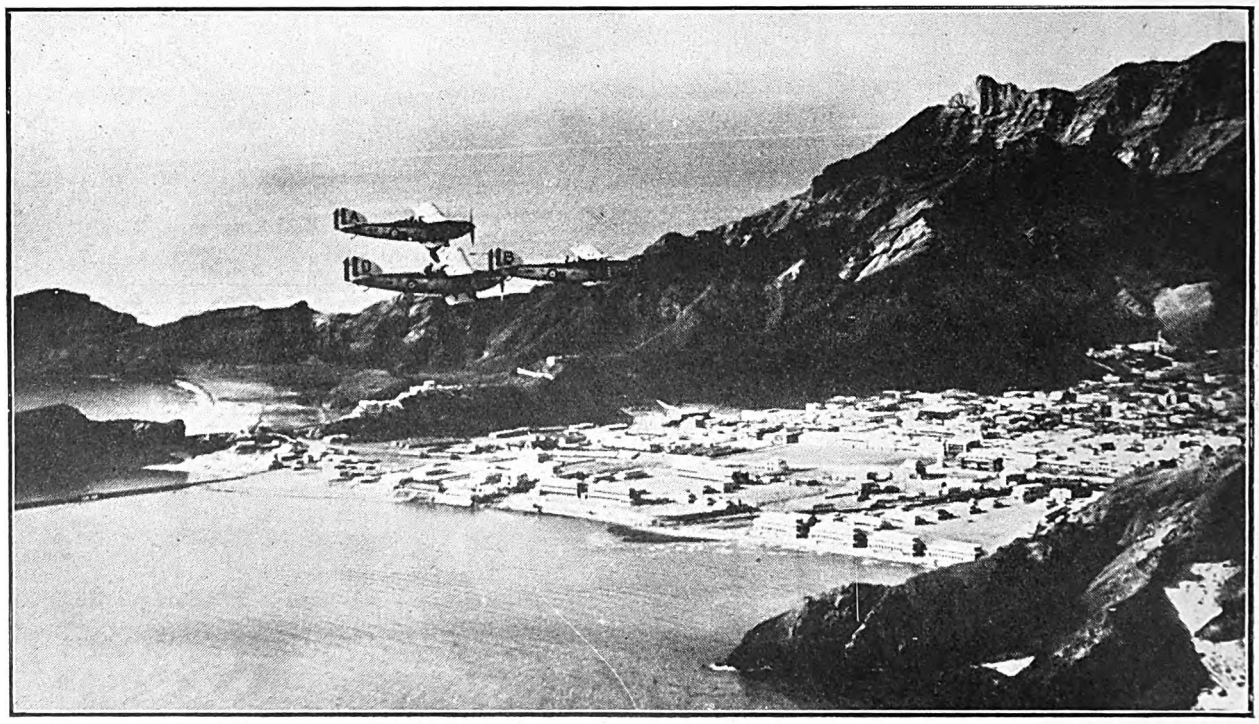
### Foreign Officers with R.A.F. Units.

Lieutenant Tsicaliotis, of the Greek Air Force, who has been attached to the School of Army Co-operation since Sept. 1, completed his course on Nov. 22 and will now proceed to the Central Flying School for a refresher course until Dec. 23, thence after the Christmas Holidays to No. 3 Flying Training School until Jan. 16, 1931.

Lieutenant Motzfeldt, of the Norwegian Air Corps, is to be attached to the Armament and Gunnery School from Nov. 24 to 26 inclusive, in order to study the work and organisation of the School.

### The Dwina Relief Force Dinner.

The eleventh re-union dinner of the naval, military, and air forces which served up-river in connection with the relief operations on the North Dwina, will be held on Dec. 6 at the Hotel Victoria, Northumberland Avenue, W.C.2. Officers who have not yet received notices are asked to communicate with Capt. S. R. W. Bennedik, 30, Fleet Street, E.C.4.



**THE DEFENCE OF ADEN.—A flight of Fairey IIIF's of No. 8 (Bomber) Squadron, R.A.F., flying over the Port of Aden.** —*(R.A.F. Official photograph.)*

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# PARIS-SAIGON

INDO-CHINA

# FLIGHT

## 3 RECORDS

**On November 8th Capt. Goulette and M. Laloutte, the French airmen, flew from Paris in a Farman "190" fitted with a 240-h.p. Lorraine Dietrich engine and made the following records:**

**Paris to Karachi in 2 days 11 hrs. 15 mins.**
**Paris to Calcutta in 3½ days**
**Paris to Saigon in 5 days 3 hrs. 48 mins.**

**ON**

# SHELL

## AVIATION PETROL




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### A Backward Glance at the C.F.S.

The interesting reminiscences of that nursery of the Royal Air Force, the C.F.S., which were disclosed at the C.F.S. Dinner and reported in The Aeroplane last week, recall to my mind the few weeks that I spent at the C.F.S., Upavon, in 1918, as an officer of the Women's Royal Air Force.

I was posted there to take charge of the women in the workshops but as there were no women in the workshops I was detailed to look after those who worked on the transport and in the cook-houses. The C.F.S. was, I believe, the only R.A.F. camp in which women did the cooking for the men's as well as for the officers' and sergeants' messes.

Members of the W.R.A.F. did not drive the ambulance but they did drive the crash tender and one day when two of them were on early flying duty the ambulance would not start when a machine had been seen to crash just beyond the aerodrome. The crash tender was quickly on the scene and the injured pilot and observer were dragged from the wreck by the W.R.A.F. driver and her "mate" just before the machine was destroyed by fire.

Colonel Jack Scott was Commandant at the time and as he was still very lame from a crash (said to have been caused while teaching Mr. Winston Churchill to fly), he used to ride round the camp on a horse. He was extremely popular but a very strict disciplinarian. His weekly inspection of the camp was a nightmare.

Marks were allotted by barrack-blocks, and the worst crime of all was to have a tap dripping in the block, because of the shortage of water. A dead fly on a window-pane also lost marks to the block. Personally I avoided these inspections because my job was to drill on the square all those W.R.A.Fs. who were not otherwise employed. This was rather a trial because half the men in the camp used to assemble round the parade-ground with critical eye and loudly-expressed criticism.

The camp, like all other camps I suppose, was a hot-bed of gossip and rumour. Also it published a weekly magazine. The prize story concerned the C.O. himself. One of the pupils had been killed in a flying accident and after the funeral the old sergeant in charge of the mortuary went to the C.O. and said that Mr. ——, who had been buried the day before, was back on the slab. The C.O., who had a grisly sense of humour, ignored the manner in which the sergeant had imparted his news and told him that this was a serious matter which must be kept very quiet. He ordered the sergeant to take a party of men and bury Mr. —— in a quiet corner of the aerodrome in the dead of night. But the sergeant was seen no more in the canteen.

A friendly spirit implored me not to miss seeing the two great sights in the camp. One was "Our Baby General," who turned out to be a Brigadier General in the early twenties who wore his staff cap with a dirty suit of blue overalls in the engine workshop all day. The other was the Padré, who either for self-discipline or as a protest against some grievance, used to don a sacking apron every morning and scrub the floor of the Y.M.C.A. hut. The Padré was also the owner of a particularly evil-smelling goat which was tethered outside his hut most of its time, and would be found on guest nights in his bed.

The W.R.A.F. officers were very unpopular at the C.F.S., and when we went to the camp cinema in the evening our arrival was always greeted with loud and prolonged hisses and groans from the junior male officers. This was because one of us (not me) had soon after her arrival there become involved in a matter of discipline. A dance for the other ranks, R.A.F. and W.R.A.F., had been attended by certain junior officers disguised in their batmen's kit. This was reported to the C.O. by the zealous W.R.A.F. officer, who explained to the C.O. that she did not know their names. The C.O. paraded the officers under instruction, and this ruthless female walked down the line and picked out the criminals.

Quite unperturbed by her action she used to go on Saturday afternoons and watch her victims doing the P.T. drill which the C.O. had decreed was to replace their week-end leave for a month. As she never went to the cinema the expressions of disapproval were aimed at the rest of us.

Apart from these lighter moments, life at the C.F.S. was pretty grim. The rain never seemed to stop during the three weeks I was there and the whole camp was ankle deep in the slippery mud that accumulates over chalk. I learned to sleep on two squares of straw mattress on a concrete floor and to face the day on a cup of ration cocoa and a hard square biscuit only too reminiscent of the kennels at home. I hope that in the next war even the C.F.S. will get its bread ration before breakfast.—C. M. MCA.

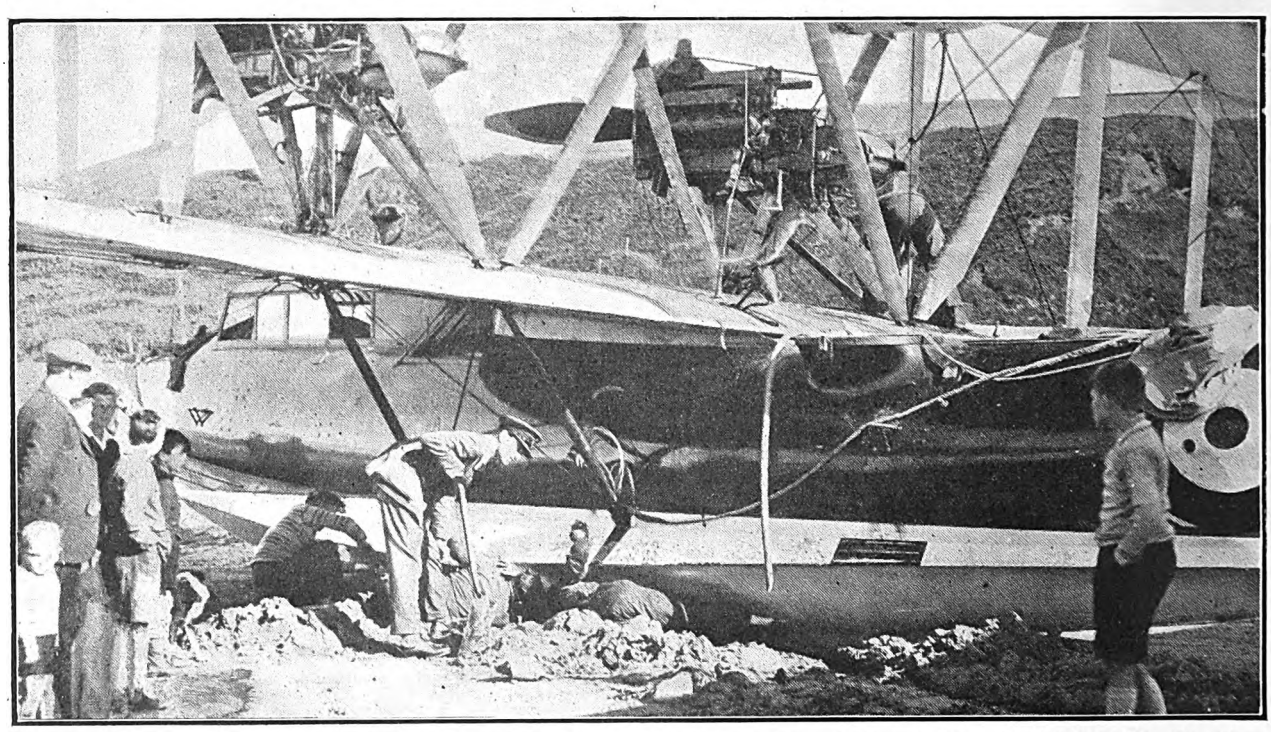
### A Memory.

One of the old-timers on Salisbury Plain writes to say that the un-named officer in the group of pioneers which appeared in The Aeroplane last week was one Burchardt-Ashton. Our correspondent adds, "He was a Dragoon who went back to his regiment during the War and got scuppered, —a good chap. The machine is the Prier monoplane (Bristol). You remember the floating fan-tail type that was impossible to control without propellor-slipstream, and of course at low speeds."

### R.A.F. SPORTS.

#### Association Football.

The R.A.F. representative Association Football team beat London University at Uxbridge on Nov. 19 by seven goals to nil. The R.A.F. scored five goals in the first half, but the University improved in the second half. Six of the R.A.F. goals were scored by L-AC. Vernon, of Halton, the centre-forward.



**SPADE WORK AT SCAPA.—Squadron Leader A. H. Orlebar, A.F.C., R.A.F., holder of the World's Speed Record, helping to excavate a Supermarine Southampton flying-boat from the sand at Scapa after it had been repaired during a Service cruise.**

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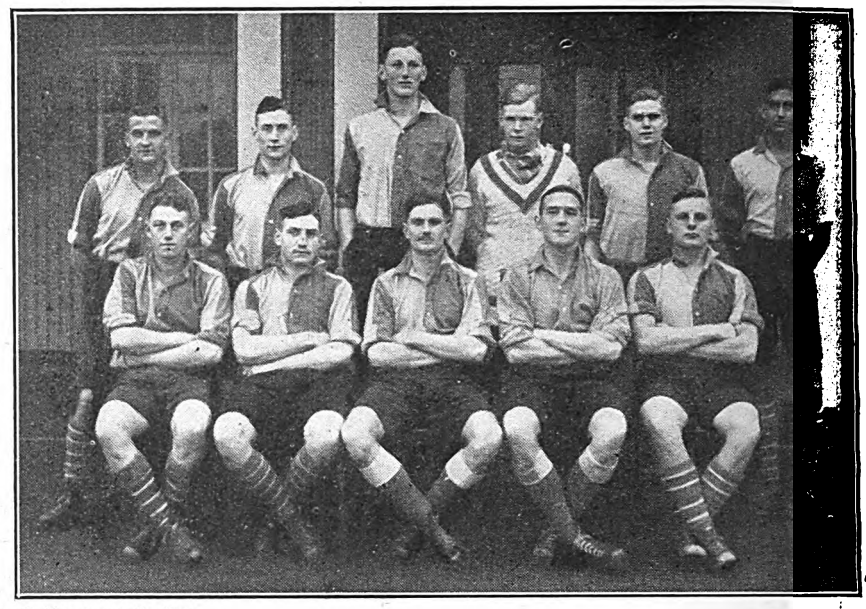


**SOCCER.—The R.A.F. College Association Football team which beat the R.M.A., Woolwich, on Nov. 15 by five goals to nil. (Back row) S. J. Marchbank, R. Monks, C. W. M. Ling, R. J. Gosnell, E. F. Porter, A. B. Awan. (Front row) A. D. Messenger, F. A. Pearce, H. A. Y. Hogan (Capt.), M. L. Baker, H. P. Burwood.**

### Association Football.

On Saturday, Nov. 15, at Woolwich, the Royal Air Force College defeated the Royal Military Academy by five goals to nil. The match was played under the most trying weather conditions and the driving wind and rain made good football extraordinarily difficult. But in spite of this the Cranwell team combined well and thus won a well-deserved victory.

Woolwich pressed hard from the kick-off, but the Cranwell backs, Ling and Pearce, by sound kicking and tackling, proved too good for them. A good movement by the Cranwell forwards followed and resulted in an easy goal by Marchbank. Although the Woolwich team had the advantage of both wind and the slope of the ground, they were unable to score. This was largely due to the fine goal-keeping of Gosnell, who saved a very hard penalty kick against Cranwell. Before half-time Cranwell scored twice. One was a high shot from near the corner flag by Baker and the other was by Marchbank.

During the second half Cranwell proved themselves too good for Woolwich and play was largely confined to their half. The good combination between the Cranwell halves and forwards resulted in two more goals, one by Messenger and one by Marchbank, before the game ended. The Cranwell team were:—

*Goal*: Flt. Cdt. Gosnell. *Backs*: Flt. Cdts. Ling and Pearce. *Half-backs*: Flt. Cdts. Porter, Burwood and Monks. *Forwards*: Flt. Cdts. Baker, Hogan, Messenger, Marchbank, Awan.

### Rugby Football.

Flt. Lt. G. R. Beamish has again been appointed Captain of the R.A.F. Representative Rugby Football Team. The Vice-Captain is Flying Officer H. A. Constantine.

The first (Northern) trial was played at Grantham on Nov. 13 and the second (Southern) at Andover, on Nov. 14. The final trial will be played at Uxbridge on Dec. 5.

The fixtures for the season are as follows:—

*Jan* 3, The Police; *Jan.* 10, Gloucester at Gloucester; *Jan.* 14, Middlesex; *Jan.* 17, Bristol at Bristol; *Jan.* 21, Cambridge University at Halton; *Jan.* 24, Northampton at Northampton; *Jan.* 29, Leicester at Leicester.

*Feb.* 7, Bedford at Bedford; *Feb.* 11, Oxford University at Oxford; *Feb.* 21, The Royal Navy at Twickenham.

*Mar.* 4, United Banks; *Mar.* 7, Pontypool at Pontypool; *Mar.* 14, Coventry at Coventry; *Mar.* 28, The Army at Twickenham.

The Hon. Treasurer is Wing Cdr. W. C. Hicks, A.F.C., Halton Camp, Bucks, and the Hon. Sec. is Flt. Lt. J. Lawson, R.A.F. (Ret.), Trulls Hatch, Rotherfield, Sussex.

### Boxing.

Sjt. W. Harper (lightweight), Sjt. J. Buchanan and AC. C. J. Clapp (middleweights) and AC. W. Munkley (light heavyweight) represented the R.A.F. in the boxing match between the Imperial Services and the Police of Gt. Britain and Ireland at the Albert Hall on Nov. 12.

Sjt. Harper won his match against P.C. Mellish, Metropolitan Police, but the others were all defeated, although Munkley's match against Garda Murphy, Dublin Civic Guards, was decided on the Referee's casting vote.

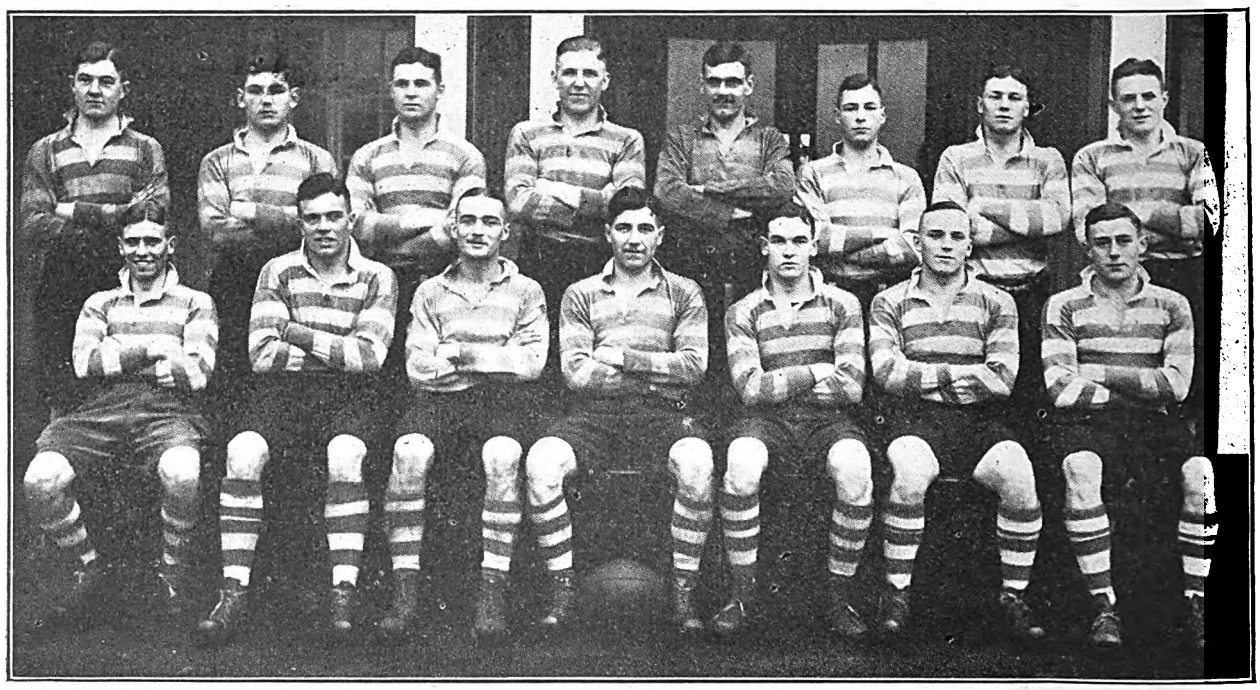
The contest ended in a draw, the Services and the Police each winning six bouts.

### Hockey.

The R.A.F. representative Hockey team were beaten by Wimbledon at Wimbledon on Nov. 15 by five goals to one. According to an expert, the team, which was not at full strength, played much better hockey than the score would suggest.

On Nov. 20 the R.A.F. representative Hockey team beat Lincolnshire at Bentley Priory, Stanmore, by three goals to two. In spite of the heavy state of the ground both sides played a good game. Three R.A.F. men played for Lincolnshire.

The R.A.F. representative Hockey team was beaten by Beckenham at Foxgrove Road on Nov. 22 by three goals to two.



**RUGGER.—The R.A.F. College Rugby Football team which beat the R.M.C., Sandhurst, by 12 points to 8 and the R.M.A., Woolwich, by 3 points to nil. (Back row) R. H. Emson, D. A. Macnair, D. Addenbrooke, W. S. Reed, F. C. Daubeny, H. W. Chesterton, E. A. Collyns, R. H. Leigh. (Front row) C. M. Windsor, A. N. Doran, J. O. Oliver, T. N. Coslett, L. N. Elsner, M. H. Rhys, T. A. Parselle.**

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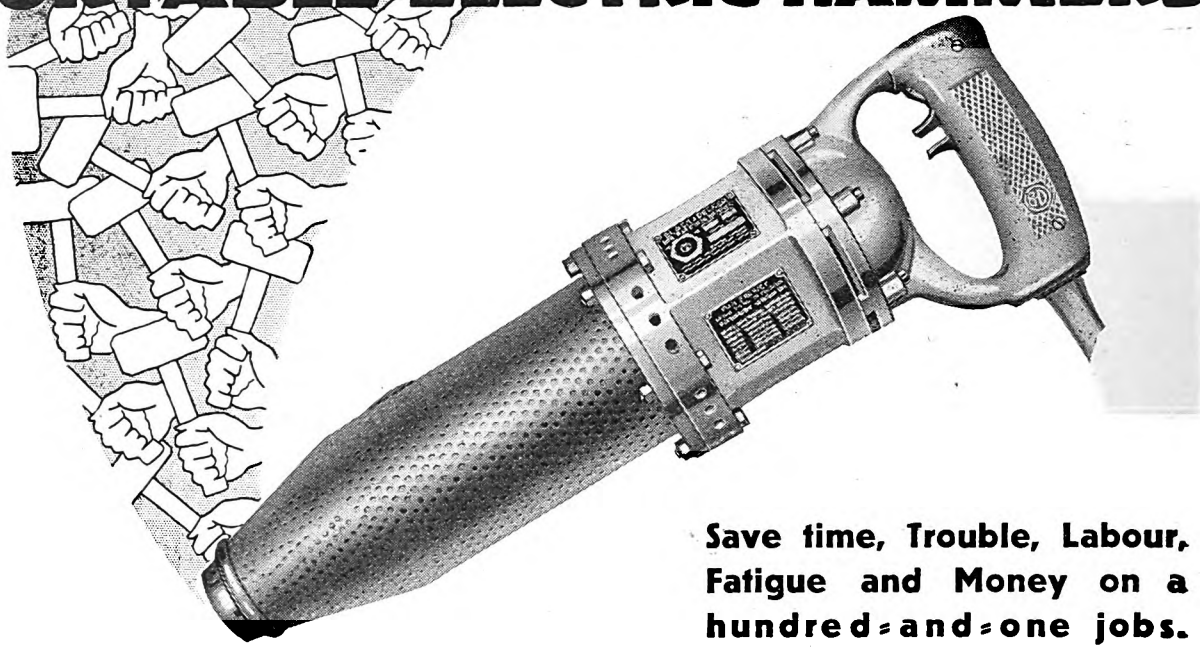

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

# TESTING THE CONTROLS OF AEROPLANES.

There was a large attendance to hear the lecture which Mr. H. L. Stevens gave before the Royal Aeronautical Society on Nov. 13. The subject was Testing Aeroplane Controls and although one would have thought that this would have been of particular interest to the pilot, the pilots who were present had very little to say about controls as they are. From which one might infer that controls today are perfect and that no improvement is needed.

This seems unlikely when one remembers that experienced car-drivers are always the people who hate improved forms of gear-changing, and similar gadgets for making cars easier to drive. The skilled performer on any instrument is an artist who has had to spend many painstaking years learning to get the best results and generally he is not anxious for anything to be produced which will make mastery of his art easier.

For the purpose of his lecture Mr. Stevens divides aeroplanes into three classes:—the obstinate, which is subdivided into the vicious and the self-willed; the self-controlled; and the easy-going.

In its worst form the obstinate and vicious machine is highly unstable and its controls are heavy. It wants to dive at high speeds and rear at low speeds, at which it also has a violent turning tendency. It swings when being taken-off or landed. If accidentally stalled one wing drops and the machine gets into a spin. If it is allowed to spin for any length of time it refuses to come out until the pilot decides to leave by parachute.

The cure for fore-and-aft instability is to move the Centre of Gravity farther forward; fitting a larger tail or lengthening the fuselage does not always work, as both these remedies bring the C.G. further aft. A big turning tendency in the air can be cured by increasing the diameter of the airscrew.

Alternatively the fin may be set over, or the fin and rudder may be cambered on one side to divide the tendency between climbing and gliding. Because of the extra air-speed over the fin, caused by the slip-stream when climbing, a reduction caused by off-setting the fin will appear considerably less in the gliding condition.

The cure for swinging on the ground is difficult to prescribe as there is very little information about the cause. Adjusting the position of the wheels in relation to the C.G. is sometimes effective.

The cure for dropping a wing at the stall is generally slots. Careful design can probably make this tendency very small. Mr. Stevens feels that when once ailerons have been used at the stall, slots are the only certain preventative of the incipient spin.

The cure for a flat or prolonged spin is more and better disposed fin area, and above all a long fuselage. According to theory, concentration of the main masses in the longitudinal direction should help.

The obstinate and self-willed aircraft is very stable. It requires large forces or large angles to break its will. On the other hand it responds to every gust and can be kept quiet only with difficulty in bumpy weather. Probably the trim varies greatly with engine off and on.

Moving the C.G. backwards, reducing the stabilising areas, reducing the dihedral angle, and effectively balancing the controls, are all cures for this case.

The self-controlled aeroplane has a moderate degree of stability and can be flown with hands off at all speeds. If flown with the feet off it should only turn slowly. It will not spin unless made to, and when the controls are abandoned the machine comes out on its own. At the stall a wing only drops slightly, if at all, and the machine can be brought up to a level keel with small loss of height. At the stall the nose is well up. The controls do what one would expect at all speeds, and only moderate forces and angles are required for fighting manœuvres. It does not respond violently to bumps.

The easy-going aeroplane is stable with controls held fixed and neutral, or slightly unstable, with controls free. It can be put through all manœuvres with small control forces and angles. It has very little change of trim with engine on or off. It can be spun and should recover when the controls are centralised in not too steep a dive. A machine of this type is not particularly responsive to bumps. It has a small turning circle and is steady in a dive.

Machines for commercial work and bombers should come within the self-controlled class. Machines intended for exhibition flying and fighting should be in the easy-going category.

After stating that all controls should be instinctive and that in the ideal machine one would merely lean towards the way one wished to go, Mr. Stevens confesses to holding a dreadful heresy and says that to his way of thinking the rudder controls work backwards and are not instinctive. He believes it is a legacy from the sea whereon one ports one's helm to go to starboard. [Personally one has the idea that this control was used just because it was the easiest way to connect up the rudder with a control. M. Henri Farman, who was a racing cyclist before aeroplanes or motor-cars were invented, has always flown with his rudder-wires crossed, so that his rudder-bar works like the handle-bar of a bicycle.—ED.]

In the ideal aeroplane the response should be proportional to the movement of the controls in all conditions of flying and should be correspondingly quick as the forward speed of the aircraft is increased.

When a machine is being turned or looped the extra lift to overcome the centrifugal force is obtained by increasing the incidence. As the speed is reduced the incidence has to be increased even further and after a certain limit the lift cannot be increased. Thus when gliding in to land to slowly one pancakes, as there is no excess lift available to curve the path of the aeroplane and bring it parallel to the ground.

At speeds reasonably removed from the stall a control which gives a response proportional to its displacement is not difficult to achieve. The aeroplane should be capable of being returned to an even keel as readily as it can be disturbed from it.

The next ideal condition is that the controls should be independent, that is to say the movement of the controls about any axis should produce, initially at any rate, a movement of the machine about the same axis, and that axis only. This is satisfied by the elevator control and fairly well by the rudder and aileron controls at all normal speeds, but it is far from satisfied by the normal aileron control near the stall.

From the ideal standpoint all the three controls should be in harmony with each other, that is that the angles and forces required by each control for general manœuvring should be of the same order. Mr. Stevens suggests that this requirement would result in lighter aileron controls than we have at present. Perhaps we should go further and make them even lighter, as the direction in which one has to move the control-column to work the ailerons is the one in which one finds most difficulty in exerting much force.

Mr. Stevens suggests that this harmony of controls is more important than generally realised and says that there is no more dangerous aeroplane for the beginner than one in which light aileron and elevator controls are combined with a heavy rudder and a pronounced turning tendency.

Recapitulating, Mr. Stevens says that response must be quick and snappy, particularly for changing from a turn of one hand to one of the other. This manœuvre shows up heavy and ineffective ailerons quicker than any other.

He says that controls must be light to operate and suggests a maximum force of ten pounds for any reasonable manœuvre. Controls must not be tiring on long flights. There must be little turning tendency, as a continuous pressure of only three pounds from one foot is tiring after an hour's flight.

There should be no tendency to swing when getting off, the tail should come up quickly and the attitude should be well under control. There must be enough control at slow speeds to make a neat three-point landing. The wing must not drop at the last moment nor must the aeroplane swing when speed is lost. The change of trim due to slip-stream must be small.

Mr. Stevens then deals with the question of control at the stall and explains that the ordinary lift and drag curves show that as the incidence is increased the lift increases up to the stalling point, beyond which further increase of incidence merely results in a decreases of lift. Drag on the other hand increased steeply with increased incidence.

Now if one imagines an aeroplane rolling so that the port wing is going down and the starboard wing is going up, the incidence of the port wing is relatively increased and similarly the lift on the upward-moving starboard wing decreases, thus there is a resultant force tending to stop the motion. The increase of drag on the lower wing and the decrease of drag on the upper wing tends to turn the nose of the aeroplane down towards the lower wing. Above the stall however the lift effect is reversed and the drag effect increased with the result that the rolling tendency increases and the turning effect is also increased, this results in a violent rolling turn or beginning of a spin.

Now if we consider the effect of the ailerons at the stall without any rolling action, we shall see that small downward movements of the aileron give a small increase of lift, large movements may even lead to loss of lift. Upward movements always give a reduction in lift. Downward movements increase, and upward movements largely reduce, drag.

Thus at the stall although the initial response might be in the right direction it is immediately overcome by the roll due to the turn and the aeroplane finally rolls against the ailerons. If the ailerons

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are used against a roll already developed the result is worse as the larger incidences have already been reached on the wing.

One cure is the use of a wing-section with a flat-topped lift-curve but although lateral stability can be obtained this way, to get control is more difficult as the downward-moving ailerons make the section a high-lift cambered one and the property of the flat-topped lift-curve is lost.

The most obvious cure is to ensure that the wing-tips do not stall until long after the rest of the wing and in its various forms the well-known slot is an example of how this can be done. Washed-out wing-tips and tips of different section from the rest of the wing are other ideas.

The ailerons also can be used differentially, with the upward-going one moving much further than the downward-moving one. Floating ailerons, or wing-tips which are a kind of variable wash-out, can be used.

The shape of the wing-tip may be important and Mr. Stevens thinks that the leading edge should always be longer than the trailing edge. All these devices except the slot result in loss of lift, and if the slot is pushed to its logical conclusion and the machine is fully slotted then some extra device is required at the wing-tips and we have the interceptor and this affects the lift adversely.

One other method is to arrange the longitudinal control so that the wing cannot be stalled without a yank on the controls, at the same time a wing which has a low drag at the stall is used. In this case the attitude near the stall is very much nose up so that the pilot gets a good warning of the impending stall and can also make a three-point landing at a speed very little in excess of the stalling speed.

Mr. Stevens says that strange forms of lateral control have been used but they seem to result in snatchy non-progressive results.

After saying that an aeroplane should come out of a short spin in something between half a turn and a full turn, and out of a long spin in not more than three turns, Mr. Stevens says that the cure for difficulty in getting out of a spin is increased or better disposed fin-area. Making the fuselage deeper at the rear end and leading it to a vertical knife edge has a good effect. A good long fuselage to start with is a valuable insurance against this trouble.

On a dive an aeroplane must be a steady gun platform and not require large forces to dive it. The lateral trim must be accurate the machine must be stable fore and aft and the rudder balance must be carefully designed to prevent directional hunting.

After this somewhat lengthy consideration of what ideal controls should be like and the way in which various faults can be overcome Mr. Stevens goes on to the question of testing.

He says that the present Martlesham Heath reports on general handling are based on expert opinions only. They are not backed by any measurements to show how good or bad an aeroplane is.

There is a difficulty in that the best aeroplane on controls may not be the best on performance and how is one to judge between them? Martlesham's main job is to help the Air Ministry to get the best aeroplanes into service and to get them there quickly.

Mr. Stevens has an idea that the Aircraft Industry would be helped if the test-pilots of interested firms were allowed to fly the winner of an Air Ministry competition.

Talking about the question of measurements Mr. Stevens says that from the Air Ministry point of view if the best aircraft are being obtained without the use of figures they do not want to waste extra time in getting figures.

Figures are desirable from the contractor's point of view as giving a standard to which to work. Figures are essential for the purposes of research but Martlesham is not necessarily the place to get them. Everybody would like figures if they could get them without holding up the reports.

Mr. Stevens says that they (at Martlesham) have been looking round for things to measure, remembering that the things they measure must not involve extra flying, and the means of measuring them must be fitted in five minutes. The two features that were chosen for experiment were Control at the Stall and Fighting Manœuvres.

Three tests were tried for Control at the Stall. The first was "Tyro's Take-off." This test yields no figures, but gives some valuable facts about the machine, which is flown on a steady climb, the engine is then cut off and the aeroplane turned with the nose well up.

The next test, the "Stalled Glide," gives actual figures of some value. The aeroplane is held as steadily as possible for one minute with the tail-setting at the negative limit, stick right back and the engine off. A recording Air Speed Indicator is carried and the fluctuations in the record give some idea of controllability in the stalled state.

The third test is "Sustained Spins" which gives the number of turns required to recover. The loss of height in the spin and in the recovery, and the time for each turn are obtained as well. A recording accelerometer is also carried. This test is made by spinning with the C.G. set to its back limit, with the tail put right back and the engine switched off. At least eight turns of a spin are made. The pilot then endeavours to recover, first by centralising the controls and then reversing them.

Fighting Manœuvres at the moment are only judged by opinions, although accelerometers are carried. In the near future figures may be given for the smallest turning circle, the minimum time to complete a figure of eight and the forces that have to be exerted at different speeds.

Mr. Stevens then showed some slides illustrating the various forms of equipment which are available for measuring the various forces. The forces required to move the controls can be measured by either a Force Measuring or Force Recording attachment to the control column. In the same way a Force Recording attachment could be attached to the rudder bar. Indicators and Recorders can be attached to the control wires but so far they have not been successful. The simple form which only records the greatest force obtained are difficult to interpret and the recording instrument at present has too much friction.

Accelerometers, Rate-of-Turn Recorders, Camera Obscura and Cinema Cameras are all used for taking measurements in the flight path. Simple measuring devices and recorders are also used for measuring the control angles. All the recording instruments are synchronised by another instrument which interrupts the records at regular intervals of time.

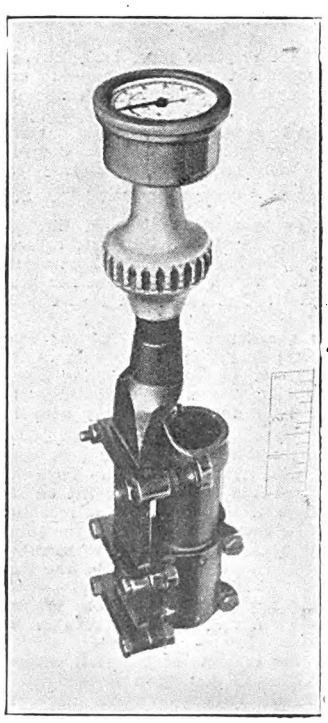
Mr. Stevens thinks that the maximum amount of information that can be expected in the course of type trials is:—

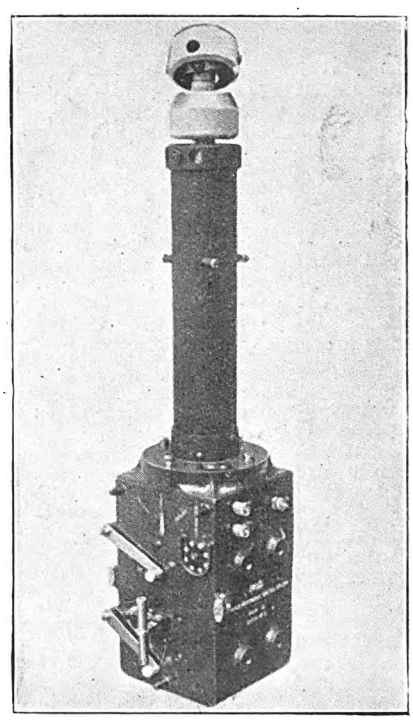
(1) General opinion of three or four pilots who are used to the particular class under test.

(2) Accelerometer records in handling and fighting trials, also in spins in which; in addition, the turns and height-drop both in the spin, and in the recovery therefrom, will be observed.

(3) Actual measurements with a camera obscura and control-wire maximum-force indicators of some manœuvres such as figures of eight, which would give the time to perform the manœuvre and the maximum force required.

Mr. Stevens gives a list of the lessons which have been learnt from





**RECORDING INSTRUMENTS.—On the left and in the middle are shown a Force-measuring and a Force-recording device, both for attachment to the control column. On the right is an instrument for recording angles of the elevator. The small windmill on top drives a recording film.**

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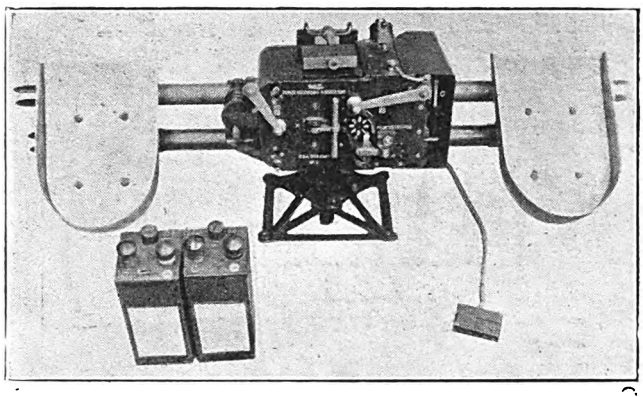

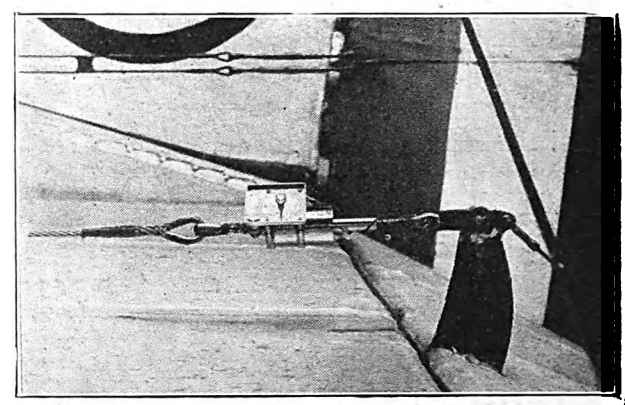

**MORE INSTRUMENTS.—On the left a Force-recording rudder-bar. On the right an instrument for registering the highest force applied to the elevator cable.**

testing controls and analysing the reports of others, under eleven headings:—

Controls must be harmonised.

Friction should not be tolerated.

Small chord controls down to 30 per cent. for ailerons, 35 per cent. for elevators, and 40 per cent. for rudders are adequate.

Ailerons should be on all four wings.

A long fuselage is an insurance against many troubles. The American rule that the tail organs should be outside the circle containing the wings is very sound.

Fins and rudders must not be blanked by the fuselage at large angles of incidence.

With ailerons balanced by set-back hinges, 35 per cent. balance if the nose is symmetrical and 25 per cent. if it is of the Frise type, can be used. Rigging down the ailerons makes the Frise type heavier and the symmetrical type lighter.

A plain open slot gives laterial stability at the stall. A slot coupled to the aileron and working from the closed position gives control at the stall but not stability. The latter arrangement working from the open position should give stability and control, but has been disappointing in practice.

The slot-cum-aileron-cum-interceptor does almost all one wants but is getting too complicated. We want to evolve something new altogether which must work smoothly.

Some aeroplanes without slots do not drop a wing at the stall and this property seems to be a function of wing-section and the shape of the wing-tip. The section with a flat-topped lift-curve produces this effect on some aircraft and not on others.

Slots are not a cure for the flat spin.

Summing up Mr. Stevens says that research on models as far as testing controls goes is largely developed to the old end of finding out how nearly model and full-scale results agree. Research also has to be directed to finding out what measurements are essential.

Choosing the best aeroplane in a competition can be safely left to the opinion of expert pilots.

In order to improve aircraft controls we must find out what qualities make any particular aeroplane the best of a selected number. This can only be done by finding out what pilots do to the machine, what forces they use to do it, and how it responds.

THE DISCUSSION.

Mr. Fairey after expressing his own and the Society's appreciation of Mr. Stevens' paper said that he would leave the pilots, a number of whom were present, to deal with Mr. Stevens' heresy concerning the rudder-bar. At present the approving of a machine depended upon the combined opinion of a number of selected pilots. An objection to such a combined opinion was that most pilots tended to get set in their approval of one type of controls.

There was the chance that Martlesham might ask for too much from a general or commercial type. He was very interested in Mr. Stevens' suggestion for timing a figure of eight and asked whether he could not produce a schedule of similar tests upon which the controllability of an aeroplane could be based.

Sq. Ldr. Tom England said that Mr. Handley Page wished to express regret for not being present but a long standing engagement made it impossible for him to attend the lecture. He personally (Sq. Ldr. England) agreed with Mr. Stevens' remarks about long fuselages. He drew attention to the difference between dropping a wing in a stall and the same occurrence on a stalled turn. In the latter case slots were of undoubted value. He said that Dr. Lachmann was going to send in a written contribution about the Flat Spin.

He agreed that the rudder controls did work backwards. The throttles of certain foreign aircraft worked backwards and he suggested that the time had come to arrive at an international understanding on the matter.

We did not want to make a wing entirely unstallable as there were times when this feature was of definite value. He thought that the idea that the test-pilots of other firms should be allowed to fly the winning machine of a competition was excellent. The interceptor slot arrangement had now emerged from the experimental stage and was quite free from complication.

Sq. Ldr. J. L. N. Bennett-Baggs, who said that on the whole he agreed with Mr. Stevens, asked how we were to decide what the loads necessary to operate the controls should be and when this had been decided, how the ratio of the loads of the three controls to each other were to be fixed.

Sq. Ldr. R. A. de H. Haig referred to a formula for manœuvrability that he and Mr. Stevens had worked at some four years ago. He suggested that if too many gadgets were used to improve control there was a chance of the increased weight decreasing the performance. He said that the testing of the tail-trimming gear should be an important part of testing the controls.

Mr. H. B. Irving first drew attention to the fact that Mr. Stevens had been responsible for the design of many of the instruments which had been shown on the screen that evening. He said that model tests showed that in certain forms of spin the blanking of the control surfaces by the body disappeared and the fin and rudder became blanked by the tail-plane. Indeed in certain cases the forces on the fin and rudder became reversed. The remedy was deepening the fuselage and raising the tail-plane. The effectiveness of slots decreased with the increase of incidence after the stall and in a flat spin the incidence might be very high.

Flt. Lt. C. H. Cahill said that to get out of a steeply-banked turn you pushed the rudder up with the upper leg which he suggested was more normal than pushing the rudder up with the lower leg.

Mr. J. S. Buchanan, Assistant Director (Aircraft) in the Department of Supply and Research, said that research must also ensure that you do not fit dangerous controls. He said that with so many new types going through Martlesham all the time the standard of control arrived at there must be the best.

Mr. R. McKinnon Wood referred to a statement by Mr. J. D. North who had said that if you could measure stability it would be possible to get it. Much the same thing was the case with controls. Referring to Mr. Stevens' remarks that an aeroplane should get out of a spin in three turns he said that this was not really enough as much depended upon the way a machine was put into a spin and even after repeated tests there was always the chance that one day the machine might be put into a spin under different conditions and that it would not come out.

Mr. Bramson suggested the use of an incidence indicator which would give a much better idea of the approach of the stall than the air-speed indicator. The relation between speed and the stalling point depended upon the loading and was therefore variable. He suggested that such an instrument might be useful when determining the rate of turn.

Dr. Thurston said he believed it was a fact that slots had not been so effective in the United States as here and suggested that was because thicker wing sections were used over there. He suggested the use of a rotor which gave better results than a rider-plane. He also referred to the APT method of lateral control.

Mr. Stevens in his reply said we must be sure that the things we measure are such that higher figures will mean improved control. The difficulty was to find what to measure. He said in answer to Sq. Ldr. England that aeroplanes which did not drop a wing at the stall might be vicious on a turn. He quoted the case of the mechanic who wished to slow down an engine in a machine whose throttle worked the wrong way, he pulled the lever back with the result that the aeroplane tried to climb the side of the hangar.

Answering Sq. Ldr. Bennett-Baggs he said that the only way to arrive at the forces required was to measure them and then to find which set of forces gave the results that were the most popular with the pilots. He agreed with Mr. Irving that under certain conditions the tail-plane blanks the rudder. It would be possible to foretell the controllability of a machine from models once you had decided what to measure, if model results and full-scale experiments could be made to agree.

He said that perhaps Dr. Thurston's new control was what we were looking for. If so he wished him luck with it. With regard to his remarks about the use of the slot in America he suggested that the real reason for its lack of use was that America did not want to pay for it.

## A BERLINER-JOYCE FIGHTER.

The B/J Aircraft Corp. (Berliner-Joyce), of Baltimore, a newcomer to the military aircraft field in the U.S.A., though Major Joyce is one of the best-known personalities in American Aviation, and a notable war-pilot, has submitted for test to the U.S. Navy an experimental single-seat fighter known as the XFJ-I.

It has a monocoque fuselage with the upper plane directly on the top of the fuselage and in line with the pilot's eye. The lower wing is placed just above the wheels and only a few feet from the ground. It has a 425 h.p. Pratt and Whitney Wasp engine.

The company is also completing a two-seat pursuit aeroplane known as the XP-16 for the U.S. Army and the XO-31, a light observation plane, for the U.S. Navy.

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*The illustration shows one of the four Supermarine-Napier Southampton Flying Boats which journeyed to Australia in 1928.*

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# RECENT DEVELOPMENTS IN COOLING AERO-ENGINES.

On Nov. 20, Mr. Andrew Swan read a paper on Recent Developments in Engine Cooling before a joint meeting of the Royal Aeronautical Society and the Institution of Automobile Engineers. The paper gave an outlined account of various experiments and developments which have been made at Farnborough in evaporative cooling, in the use of ethylene glycol and glycerine and also in the cooling of lubricating oil.

Mr. Swan opens his paper by drawing a distinction between the air-cooled and water-cooled types of aero-engines. He reminds us that a streamlined shape is difficult to obtain with a radial engine whereas a water-cooled type can usually be enclosed in a cowling of reasonably streamlined form, but that with this type the radiator causes appreciable drag. Wing-radiators have been used, but although these reduce the drag they complicate the structure and increase the weight of the wing.

The problem of cooling an aero-engine is therefore inseparably associated with the requirements of small drag. Most of the work described in this paper had for its primary object the reduction of drag, with, if possible, no detrimental effect on the working of the engine and no loss in the efficiency of the cooling equipment. The developments described in it are in general applicable to all water-cooled or liquid-cooled engines.

The cylinder of an engine must not be allowed to get so hot that it distorts, or that the film of oil is burnt off the surfaces of contact. A high temperature of the cylinder-jacket raises the temperature of the working cycle in the cylinder, the weight of the air charge is therefore reduced, with a resultant decrease in the power-output from the engine. It also tends to promote detonation. On the other hand too cool cylinder walls encourage deposition of petrol and cause inefficient combustion.

If one compares air-cooled and water-cooled engines, the former are found to operate at a higher mean temperature but the latter have a better ratio of power to unit volume. Mr. Swan says that jacket-temperatures substantially higher than are used in water-cooled engines may not be a disadvantage in view of the smaller radiator that could be used and the reduction in drag thereby possible.

Mr. Swan then divides his paper into three parts: the first is devoted to liquid coolants other than water; the second to evaporative cooling; and the last to the cooling of oil.

### Ethylene Glycol and Glycerine.

A coolant is the liquid used for the absorption of heat in a cooling system. A liquid of this kind must have a boiling point above the proposed operating temperature; it must not have any deleterious effect on the materials used in the cooling system; it must be easily circulated by pump; it must have a flash point higher than the operating temperature and preferably should have a high specific heat.

Glycerine and ethylene glycol were chosen for investigation at the Royal Aircraft Establishment as they are readily available in bulk at a reasonable cost and have most of the properties required of a coolant. Mr. Swan says that there may be other liquids, equally, or more, suitable for the purpose.

Both ethylene glycol and glycerine have little or no deleterious effect on the metals which are used in radiator systems, although they deteriorate rubber slowly. Ethylene glycol is safe from ignition by flame if the liquid is at a temperature below 124 deg. C., but at higher temperatures there is the possibility of fire through leakage or crash. Glycerine has a much higher flash point, and could therefore be used as a coolant at quite high temperatures without adding to the fire risk in aircraft. Both substances when at normal atmospheric temperatures will ignite if sprayed into a hot pipe at a temperature of 500 deg. C. or more.

The boiling points of both are high enough for the purpose in view. The specific heats are lower than water. For any given pump the circulation rates for these liquids at the high temperatures considered is greater than that of the corresponding water-system. The result is that the temperature rise though the engine jackets is increased only a little in comparison with that of water-circulation and not to the extent indicated by the relative values of the specific heats.

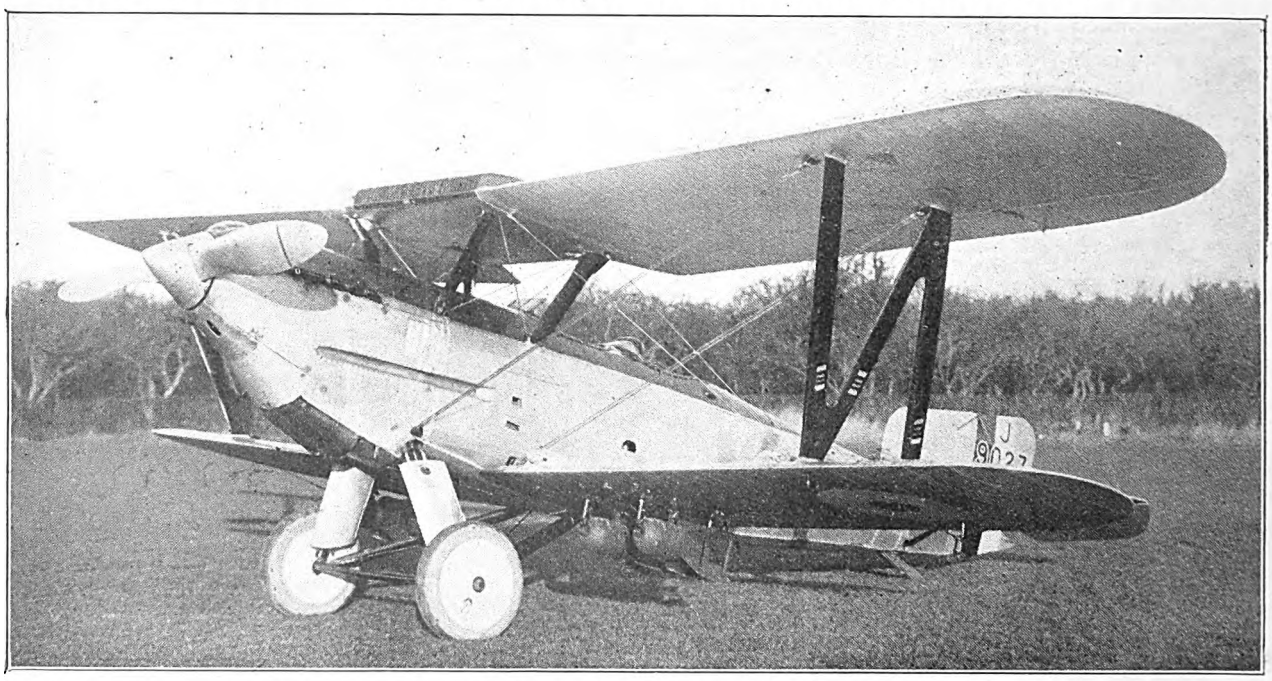
Glycerine in a pure condition, owing to its high viscosity at low temperatures, will not begin to circulate until 22 deg. C., and then only very slowly. This state of affairs can be remedied by the addition of water and for a concentration of 90 to 93 per cent. pumping can begin at -6 deg. C.

Pure or nearly pure glycerine is not suitable for use as a coolant, although it can be used at a concentration of 93 per cent. Any water content evaporated at temperatures above 100 deg. C. would require replacement unless condensed in the system itself. Should the demand arise, a low viscosity derivative of glycerine could probably be made.

Ethylene glycol is suitable as a coolant particularly up to 120 deg. C. It is very searching and great care is necessary to prevent leakage through joints. Some calibration tests of a standard engine with ethylene glycol as a coolant were made at a jacket outlet temperature of 150 deg. C. As compared with a water-cooled engine the drop in power was 7 per cent.

Against this must be set the reduction in drag, which should be at least 50 per cent., due to decreased radiator area. This is because the mean temperature difference between the coolant (Ethylene glycol at 150 deg. C.) and the air is approximately double that for normal water-cooling. The direct cooling of the engine is also increased because of the higher working temperature.

The reduction in drag becomes very important as speeds are increased and above 150 m.p.h. the loss of engine power is estimated to be more than balanced by the reduction in drag. Mr. Swan says that for a supercharged engine working with a coolant temperature of 150 deg. C. any small loss of power could be restored without difficulty by a slight increase in supercharge so that an engine so fitted would



**STEAM-COOLED.—A Fairey Fox two-seat day bomber with a Rolls-Royce "F" engine and steam cooling.**

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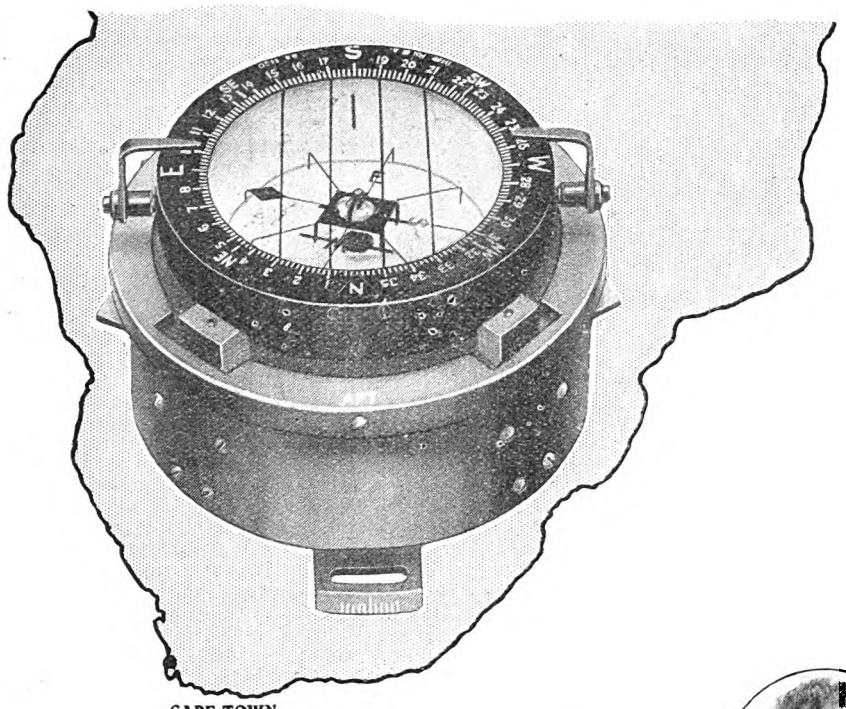
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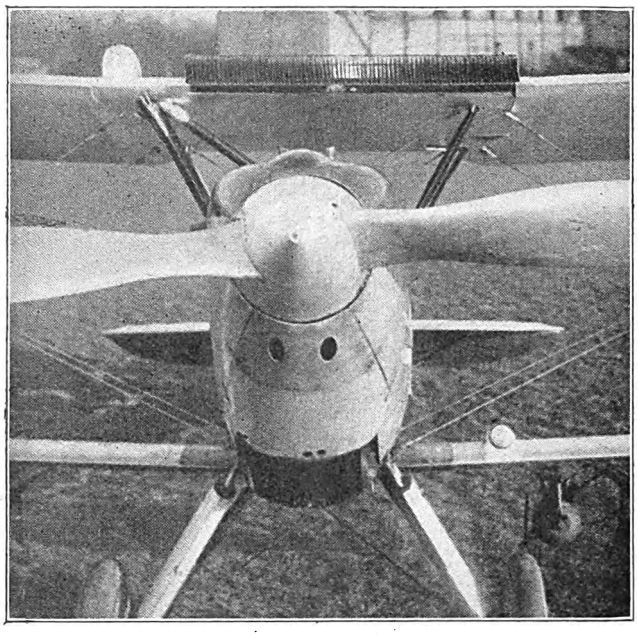

**STEAM-COOLED.—The nose of the Fairey Fox showing the main condenser on the top centre-section.**

have the benefit of reduced drag with no loss of engine power.

Summing up, Mr. Swan says, that from the limited data available, the advantages of using high jacket temperatures do not appear to be very marked unless means are taken, as in the supercharged engine, to restore the loss of power which is likely to result.

Mixtures by volume of 30 per cent. ethylene glycol and 70 per cent. water, and 36 per cent. glycerine and 64 per cent. water, are now used as coolants to avoid freezing down to temperatures of – 15 deg. C.

### Evaporative Cooling.

The water in the cylinder-jackets of an engine which is cooled evaporatively, is turned into steam, and because of the high latent heat of conversion a larger amount of heat can be absorbed per lb. of water evaporated than per lb. circulated in the normal method of cooling by water. In evaporative cooling the temperature of the cylinder-jackets is automatically controlled to that of the boiling point at at the height at which the machine is flying. Less water is required but the amount is governed by the capacity of the cylinder jackets and the reserve against loss.

When tests of evaporative cooling were made the jackets were modified to ensure that no steam pockets should be formed and the size of the outlets was increased so that the issuing steam carried with it as little water as possible. Piston and piston-ring clearances were increased slightly and in one case the gumming up of rings was eliminated by a change from treated castor oil to standard P.4 mineral oil.

After these modifications, endurance runs on the test-bed showed that the loss of power was slight and in no case exceeded 2½ per cent.

The next stage was the fitting of an evaporatively-cooled Falcon engine to a Bristol Fighter for flight trials. A triangular radiator placed above the centre-section was used.

On general flight tests, climb tests and gliding tests the cooling was quite satisfactory. The temperature of the water out of the radiator was always some 5 deg. C. below the boiling point of the height at which the machine was flying, so appreciable cooling was by water alone and on the average little more than half the cooling was estimated to be evaporative. That a great proportion of the cooling was by normal water-cooling was attributed to the large circulation and the absence of a steam separator.

A more efficient use of the system should be obtained if a steam separator were fitted close to the exit from the jackets so that only steam would go to the condenser.

When wing condensers are used the amount of water carried over with the steam must be reduced to a minimum to reduce the weight of water in the wing and the risk of a large quantity of water being held in the condensers which would deplete the amount in the jackets available for cooling.

The experiments next made with wing condensers were intended, according to Mr. Swan, to supply fundamental data of the system in operation which would be applicable in general to all types of aircraft and to obtain experience, though limited, of some of the practicable difficulties of its application.

As so much experience had already been gained with the Falcon engine this same engine and Bristol Fighter were used. Condensers were placed along the leading edge of each wing as far as the outer strut. R.A.F. 30 section wings were used as their shape allows the condensate to be drained to the bottom of the front spar under all conditions of normal flying.

The steam and water from the cylinder-jackets passed to the steam separator which was placed in the Vee of the engine. It was also designed to serve as a reserve water tank of two gallons capacity. It is a long cylindrical tank with twelve branches.

From it the steam flows simultaneously to each of the four condensers. The top wing condensers receive the steam at the centre section but the lower condensers are supplied at the wing-roots. The lower centre-section was used as a collector for the condensate. The water from the separator is returned by the usual circulating pump to the jackets. The condensate is returned by another pump.

The total quantity of water in the system is 4½ gallons, of which 2½ gallons is required to fill the engine and its piping to the bottom of the steam separator. The remaining 16 pints (measured cold) is the reserve water. The expansion of the whole when heated to the boiling point is some 4 per cent.

Some difficulty was at first experienced in getting equal distribution of steam, but eventually a good enough compromise was got by fitting control ferrules in the main steam delivery pipes from the separator to each condenser.

With the whole of the condenser surfaces in use the loss of water averaged under one pint for a climb to 5,000 ft. and a cruising flight of two hours' duration. With one bottom wing condenser out of action the loss on climb was 1½ pints, with a further loss of 1¾ pints per hour for a cruising flight of two hours (winter conditions). With bottom wing condensers out of action the loss on climb was excessive. A total flying time of thirty hours revealed no defects other than minor ones.

The system also worked satisfactorily with an anti-freeze mixture of 30 per cent. ethylene glycol solution and water. The weight of the machine as fitted with the evaporative cooling system was approximately the same as when fitted with a normal system.

Summing up, Mr. Swan says that the condenser which occupies the leading edge in front of the main spar would appear to be restricted in application to wings of comparatively small size and of a large surface per h.p. In large wings the condensers would have a high ratio of volume to surface and cooling might be adversely affected.

As the upper surface of a wing has good cooling properties for a considerable proportion of its chord a condenser of low ratio of volume to surface could be obtained by using a double skin construction. He also suggests the introduction of a retractable radiator to deal with conditions of peak load when the available wing area is definitely limited.

### The Cooling of Oil.

Now that engines are more encowled so that oil systems are less exposed to the cooling air stream, and now that the horse-power per unit volume has been increased so that more heat is transferred to the oil with no corresponding enlargement of exposed surface likely to aid cooling, provision for cooling the lubricating oil is becoming necessary.

The generally accepted practice is that oil should not enter the engine at a higher temperature than 70 deg. C., and though the rise of temperature of the oil inside the engine may vary considerably it seldom exceeds 20 deg. C. Mr. Swan says that there is evidence that as regards the load-carrying capacity of the oil higher temperatures could be used with advantage, and tests made at the National Physical Laboratory show that temperatures up to 120 deg. C. can be used for any loads which are likely to occur with aero-engines.

The advantages in working at a higher temperature are that the bigger temperature drop would make cooling easier, as would also the decreased thickness of cold oil on the walls of the cooler. The disadvantages are that there would not be enough margin for local hot spots and the reduced viscosity at the very high temperature would make it difficult to ensure that every bearing got an adequate supply.

A radial air-cooled engine had been run for about an hour with an oil outlet temperature of about 120 deg. C., and later for a shorter period at a temperature of 150 deg. C. The condition of the engine proved to be excellent on examination.

The efficiency of an oil-cooler depends upon the rate at which heat can be transferred from the oil to the metal and

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from the metal to the air. The latter rate does not vary much, but because a layer of cold oil is likely to form on the surface of the cooler a good rate of transfer from the oil to the metal is difficult to obtain.

Mr. Swan, after saying that the several types of oil coolers in use had been described in Mr. Foord's paper before the Royal Aeronautical Society, already reported in THE AEROPLANE, described the Vickers-Potts and Carter type of coolers.

The Vickers-Potts cooler has a number of flattened elliptical elements placed edgeways to the airstream, and through them the oil is forced by a pump. When the oil is cold a bye-pass arrangement short-circuits the flow. This cooler has the advantage that the addition or subtraction of elements is an easy matter.

The Carter cooler works differently. A streamlined cooling element has within it a centrifugal filtering arrangement which is used to clean the oil. This is rotated at high speed by the reaction from two jets placed on top of it, from which jets the oil issues against the walls of the cooler

These jets of oil not only rotate the centrifuge but they also have a scrubbing effect upon the walls and ensure that there is no thick layer of cold oil adhering to the walls of the cooler. This action is helped by the addition of short vertical fins on the interior walls of the cooler.

The heat-dissipating efficiency of a good oil cooler is estimated to be approximately 60 per cent. of that of water radiators. The amount of heat to be dissipated is so small, about 2 to 3 per cent. of the engine power (an oil cooler has generally to reduce the temperature of the oil some 8 to 10 deg. C.), that any possible reduction of weight is only of small amount. The drag of an oil cooler at 100 m.p.h. is quite small but at 200 m.p.h. is large enough to warrant special attention being given to its design.

In the machines for the Schneider Trophy Contest the oil coolers were specially designed to form part of the fuselage skin and for this purpose flat rectangular tubes were used. The hollow fin was also used and the oil was sprayed over its internal surface from small jets.

Mr. Swan concluded his paper with a tribute to the work of those members of the R.A.E. who did the experimental work which was described, and particularly to Messrs. H. Wood and Anderton Brown.

### THE DISCUSSION.

[NOTE.—An interesting point is that not a soul mentioned the successful steam-cooling of the Antoinette engine built by M. Levavasseur in 1909 and flown by Latham.—ED.]

WING COMMANDER T. R. CAVE-BROWNE-CAVE, who was called upon to open the discussion, said that the elimination of air from the system was most important as its presence decreased the rate of condensation. The triangular radiator, as developed for airship use and mentioned by Mr. Swan, was selected because it helped the elimination of the air. As the volume of the steam was important the double-skin radiator was not advantageous. A big volume of steam was also advantageous, because during take-off or climb the engine heat could raise steam without any condensation.

Steam cooling had always been used on H.M.A. R.101 and had given no trouble in service. Although there was about three times as much air-cooling to be done in a Beardmore Tornado as in a Rolls-Royce Condor, this had been successfully achieved by a form of crankcase cooling. The air for combustion was drawn through the crankcase to cool the oil. This has the advantage that it also cooled the bearings which made the oil hot. Actually half the air for combustion was drawn through the crankcase.

He asked if there was anyone present who could tell him something about explosions in the crankcase and their causes.

He asked whether the oil people could give us an oil which would work at higher temperatures. He pointed out that evaporative cooling is ideal for heating passenger accommodation and had been used most successfully for that purpose in the airship. He thought that it would offer great advantages for similar use on motor-cars.

MAJOR T. M. BARLOW referred to the experimental and development work which had been done by his firm (The Fairey Aviation Co. Ltd.) and said that it had been divided into four stages.

The first stage was a 100-hour test on the test-bed with evaporative cooling.

The next stage was the design of a separator which had to fit under the cowling.

The third stage was a reproduction of the actual flying conditions in the test house.

The final stage was the full-scale trial on an actual machine. A Fairey Fox was used and so far about fifteen hours had been flown with this equipment.

If an evaporative system was to offer any advantages it must be lighter than existing systems. Their system was already 100 lbs. lighter, but he felt sure that a system 150 lbs. lighter could be produced.

He thought that means to reduce the drag should be found without using wing radiators as these presented difficulties if the engine was to be run up in the fuselage or if the wings were folded.

One could not afford to lose water and there must be no such loss in ordinary manœuvres. They had climbed to 18,000 ft. without loss.

Their system carried six gallons of water, four actually in the engine. Of the remaining two, one was actually in reserve. He closed by affirming to his hearers that cooling by evaporation was an accomplished fact in Aviation.

MR. EVANS, answering Wing Cdr. Cave-Browne-Cave, said that a 1,000 h.p. M.A.N. engine had exploded as a result of the scavenger-gear getting blocked, and the mixture being fired in the crankcase. He had heard of another accident to a Diesel engine where the mixture in the crankcase exploded, but he had no detailed information.

MAJOR F. M. GREEN referred to earlier attempts to use varying coolants and mentioned the attempted use of Amaline in 1915/6. He queried Mr. Swan's statement that it was possible to get back by supercharging the loss of power due to the raised working temperature. He pointed out that one of the difficulties of working with oils at high temperature is that they disintegrate. He thought that castor oil might be better than mineral at high temperatures.

MR. DUCKHAM said that about 1906 Yarrows built a 1,000 h.p. motor-boat and after allowing him to make some investigations decided to follow his suggestion of using an emulsion of oil and water for lubrication. The system worked satisfactorily. An emulsion of oil in water absorbed more heat than an emulsion of water in oil. Referring to Mr. Swan's statement that one of the difficulties of cooling oil was due to the thick layer of cold oil which formed on the walls of the container, he said that in pipes this thick, cold layer was apt to break down at increased pressures and the whole flow become turbulent.

LT.-COL. L. F. R. FELL disclosed the fact that the Rolls-Royce R engine was tried out on ethylene glycol, but results showed that the power would have to be dropped as a result of the higher cylinder-wall temperatures. He asked whether Mr. Swan had figures on crank-case cooling, as the under surface of the crankcase, at present generally encowled, would appear to offer a way of cooling the oil. He referred to an oil-cooler which consisted essentially of a tube with a mechanically-driven scraper vane. This was very effective, but he had forgotten the name of the apparatus.

He suggested that Wing Cdr. Cave-Browne-Cave's method was not applicable to engines in which the ratio of crankcase volume to h.p. was less than that of the Tornado, and said he imagined that it would be difficult to separate the oil and the air in engines of that class. He thought that in a few years' time all water-cooled engines would be evaporatively cooled.

MAJOR G. P. BULMAN said that he had hoped to hear more from members of the Institution of Automobile Engineers, as criticism from an outside source could be helpful. He suggested as the criterion of a new development whether it was fit to be placed in the hands of the ordinary man, and from that point of view steam-cooling appeared to have the advantage over ethylene glycol.

He thought that we should not take the view that hot oil was easier to cool but that we should try and design engines which made oil less hot. He then quoted the example of an engine in which the oil temperature was successfully lowered by restricting the amount of oil in circulation. He also pointed out that the temperature of the oil outlet did not represent the highest temperature in the engine.

MR. CHAPMAN, of the Institution of Automobile Engineers, asked what the automobile engineer was going to get out of it all? Did Mr. Swan see any reason why the automobile engineer should consider the adoption of either form of cooling. He suggested that an engine might be cooled by air-cooling the cylinder walls and water-cooling the hotter cylinder heads. [As has already been tried.—ED.]

MR. B. C. CARTER then drew some extremely interesting graphs on the blackboard showing the various relationships between the factors which govern the design of oil coolers. He showed thereby how important was the designing of a cooler in which the temperature of the cooler-skin approached that of the oil, so that there should be a big drop in temperature between the cooler and the air.

MR. W. O. MANNING asked whether there was any alteration of thermal efficiency when ethylene glycol was used.

FLT. LT. ALLEN, referring to Mr. Chapman's queries about the advantages of these new forms of cooling to the automobile engineer, said that he had just returned from India where trouble was always being experienced with lorry transport because of the boiling away of the radiator water during steep climbs and pulling through sand. The use of ethylene glycol had solved this problem, because even in the Indian climate the normal radiator which was not big enough for use with water was of adequate area if used with ethylene glycol.

ANOTHER SPEAKER suggested that a mixture of one pound of pure honey to one gallon of water was a useful mixture to use.

MR. SWAN in his reply referred to the fact that Wing Cdr. Cave-Browne-Cave was probably the first advocate of steam cooling in the country. Mr. Swan then made clear that the function of Farnborough is to find out the fundamental aspects of any problem and whether it is capable of development. If it is, then the contractors can get along with such development.

He had no doubt at all that the weight of the evaporative cooling unit could be very considerably reduced.

Referring to Major Green's remarks, he said that the effect of ethylene glycol was to reduce very slightly the full-throttle height.

Replying to Col. Fell, he said that the reduction in power had to be offset by the reduction in drag. [Of course in the Supermarine racing machine there was no radiator drag because double-skin wings were used and so there was nothing to be gained by the use of ethylene glycol.—ED.]

To the automobile engineers Mr. Swan suggested that steam cooling might reduce that long period which was required with water-cooling to get the engine up to the required temperature for really flexible driving

[Also there is the fairly obvious answer that *any* improvement in cooling will reduce the size and weight and cost of the radiator, and that evaporative cooling may abolish it altogether. In any case, surely even a motor-monger has the sense to know that anything new which will provide his salesman with a fresh talking-point helps to overcome "sales-resistance" (as the current jargon of the commercial expert has it) and that, whether the novelty is really an improvement or not it will give his firm a fresh boost on the market if they take it up before their competitors do so.—C. G. G.]

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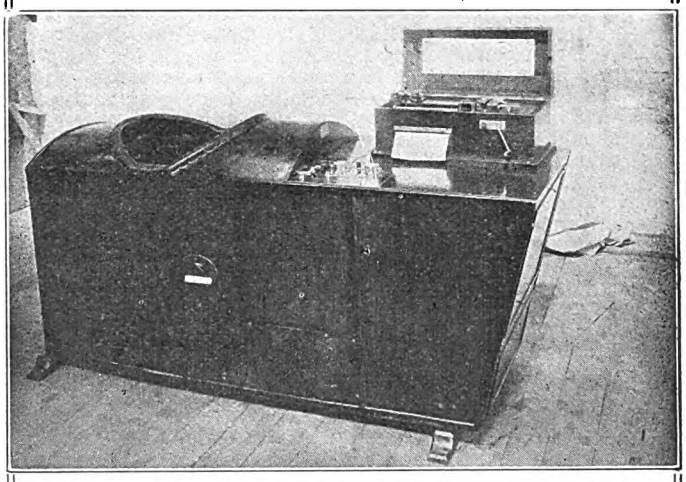

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## A YEAR'S WORK.

[*Aeronautical Research Committee. Report for the Year* 1929-30. Published by H.M. Stationery Office at 1s. 6d., and obtainable from THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, E.C.4.]

The towering fabric of modern engineering achievement is built with, and founded upon, the minute contributions of individual research. Nowhere is this more true than in aeronautical engineering. Seen from the proper distance for viewing a whole edifice each piece of research seems but a minute fragment.

Similarly, when one comes to read a report of a whole research organisation the small ends towards which its component activities are directed and the time which is taken to achieve results seems rather disappointing to the lay onlooker. One reads, and thinks as one reads, that all this was reported before. The eye of faith is needed to see the nearer approach to the ultimate goal.

The Report for this year of the A.R.C. shows a marked improvement in its make-up and is now adorned with pictures. One of these illustrates far more clearly than any pen- or word-picture could the flow of air behind a body. This is a photograph of the smoke of titanium tetrachloride flowing past a body.

The use of this chemical is being developed to trace the flow behind bodies; and, to the uninitiated, this method is of very great interest as making many forms of flow visible. and therefore appreciable.

The Report suggests that although under present methods of operation the range of an aircraft is increased by flying high, there appears to be no theoretical reason why the range should vary with height.

The Report says that the simultaneous attainment of control and stability has not been adequately achieved, and for most purposes control is considered of primary importance compared with stability. Yet, on the other hand, the lateral stability and lateral control of the D.H. Moth, fitted with slots and interceptors, are very favourably commented upon by the Report. According to this, similar experiments are contemplated on a Siskin aeroplane.

The Aeronautical Research Committee have arranged that researches on spinning should take first priority, and a Panel has been appointed to discuss and co-ordinate the programme of research. Some full-scale support of the theory that increase of the length of tail and of the area of the fin should assist in the recovery from the spin has been obtained. [Which seems to agree with the general opinion of Trade designers in 1912, or thereabouts.—ED.]

The Report makes the encouraging announcement that it understands the construction of a large (24 ft.) Wind Tunnel at the R.A.E. is now under consideration. This Tunnel is proposed to be of the open-jet type with a working space 42 ft. long by 24 ft. diameter. The tunnel would be of the single return-flow type. [In other words, it would be slightly bigger than the Propeller Research Tunnel of the N.A.C.A. in the United States. This was described in the Engineering Supplement of THE AEROPLANE for April 24, 1929. The working space of the American Tunnel is 20 ft. by 35 ft. long, and it has two return passages.—ED.]

The Report also refers to the work of the Sub-Committee who are investigating the causes of noise in aircraft with a view to making air travel more attractive. Instruments for measuring the noise have been developed, and with these some preliminary exploration of the intensity of the noise has been made. The R.A.E. have been making experiments on methods of silencing the engines.

From such a general survey one can get some idea of the broad lines upon which progress is being made. The advent of the Large Wind Tunnel is particularly to be welcomed as providing a means of solving quickly many vexing problems.—T. J.

## THE REDUCTION OF NOISE IN AIRCRAFT.

In the United States, as in England, determined attempts have been, and are still being, made to reduce the noise in, and of, aircraft. After two years' study the Aeronautics Research Division of the Aeronautics Branch of the U.S. Department of Commerce has come to rather a depressing conclusion

They consider that the only positive known method of reducing the noise from the airscrew is to decrease the tip-speed, which can be done by using gearing. [This is quite wrong. A big slow-running geared airscrew bangs a lump of air against wings and struts every time it comes round, and makes more noise in a cabin than does a high-speed screw. Also, it shakes a machine to bits. The only solution of the problem is the pusher-screw.—C. G. G.]

The noise of the engine can be reduced by the use of a "muffler," or what we should call a silencer. The best principle to use in the design of the latter is the rapid cooling of the exhaust gases. [Have they tried the "Vortex" silencer?—C. G. G.] There is nothing particularly novel in these opinions, and, in that they are what one would expect from just thinking about the problem, they are disappointing. One always hopes that actual research will provide either new problems or an unexpected antidote to existing ones.

This seems to be a case where the British method of basic research has its advantages. The Americans tried to reduce noise by actual experiment. Our people are trying to analyse the sources of noise in relative order of importance. For this purpose they have developed an instrument for measuring noise. The way this instrument works is to have a standard noise in one head-phone and to adjust the noise to be measured in the other head-phone until the intensity is equal.

Like the British, the Americans have decided that a high tip-speed means a marked increase of noise. At some speed between :7 and 1 times the speed of sound, depending upon the thickness of the airscrew, the air flow starts to break away from the surface of the airscrew and the resultant violently eddying flow coincides with a marked increase in noise. [Externally, but not internally. The pilot of a diving Fox does not hear its thrilling scream, which makes it the most popular turn at all Air Displays.—C. G. G.]

In this country the thickness of the section has been found to have a marked effect. For the same power absorption thin conventional sections were found to be some 8 per cent. quieter than thick sections.

The Americans have found that the start of the eddying flow depends primarily on the thickness of the section as compared with the chord length. The greater the thickness ratio the lower the speed at which the inefficient flow begins.

Although the Americans are advocating the use of gearing as a means of reducing the noise from airscrews, difficulties have been found in this country with geared airscrews, because when these are absorbing a great deal of power and turning slowly, a kind of low-speed vibration is set up which is a severe trial on the structure of the machine.

After a certain amount of research the Americans have decided that the general effect of a silencer is to modify the flow of the exhaust gases, thereby modifying the source of the sound and producing one of lower intensity. Working on these lines, they have found that the most effective silencer is one which rapidly cools the exhaust gases.

Cooling the exhaust gases reduces their speed, as the density of the gas is increased. The speed of sound in a gas also decreases with the temperature.

Work at Farnborough on the test-bench appears to show that a very effective way of reducing exhaust noise is to split up the gases into a large number of small jets before they impinge on the air. This seems to be further evidence on behalf of the American theory that the noise is produced by the flow of gases, or, rather, the interrupted flow of the exhaust gases.

But neither here or in America does much attention appear to have been given to the idea that a great deal of noise might be produced by the swirling slip-stream banging and swooshing against the parts of the aeroplane. Perhaps those in charge of the experiments feel that even if they did discover this to be a large contributory cause of noise there would be no practicable way of straightening the flow out.

## STEELS FOR VALVES.

When Mr. Ricardo gave the 18th Wilbur Wright Memorial Lecture before The Royal Aeronautical Society he pointed out the important part the exhaust valve had played in the development of the internal combustion engine by saying that the exhaust valve had always been the weakest link in the chain throughout the history of the four-cycle type. This might be taken as another way of saying that the conditions under which the exhaust valve has to work are so extremely trying that only a steel with very remarkable properties could withstand such conditions.

An exhaust valve must be made of steel which will retain its high tensile strength at high temperatures so that there shall be no distortion of valve or valve-seating. The steel must have no qualities of air-hardening, or there might be the chance of such a steel becoming brittle after rapidly cooling down from working temperatures. This brittleness might cause a breakage when starting up from cold. A good steel for valves must also be very resistant to oxidation, it should also be easy to work and require little or no heat-treatment.

If one tests a number of steels to find their tensile strengths at high temperatures, the results show that among the steels which have proved their worth in practice K.E.965, an Austenitic nickel-chrome steel which has been developed by Kayser, Ellison and Co. Ltd. Carlisle Works, Sheffield, is outstanding. As can be seen from the graph this steel has a tensile strength of 17.2 tons per sq. in. which is about twice that of the other steels which were tested.

These tests were all made on test-pieces which had been heated in an electric furnace to the desired temperature and then left to soak at that temperature for another 30

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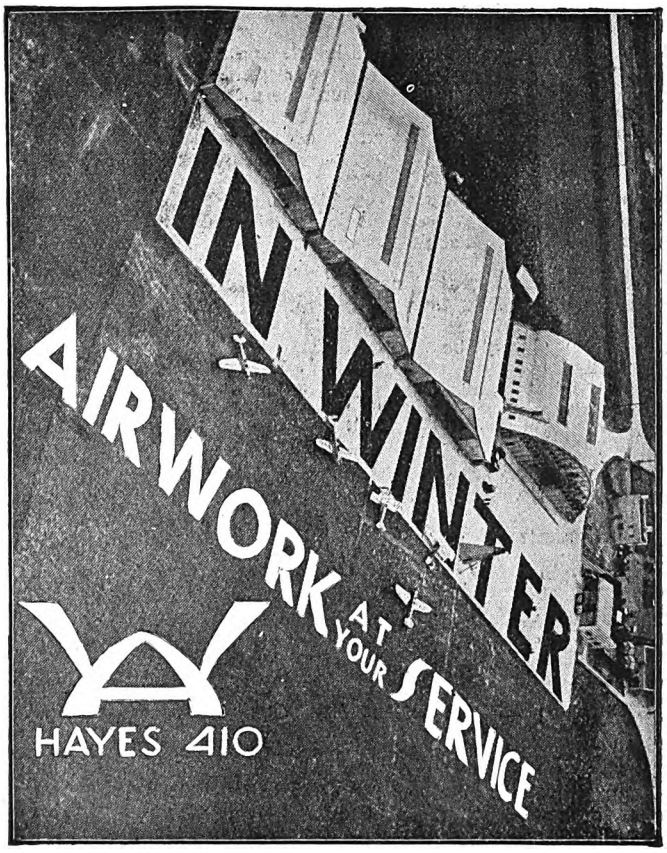





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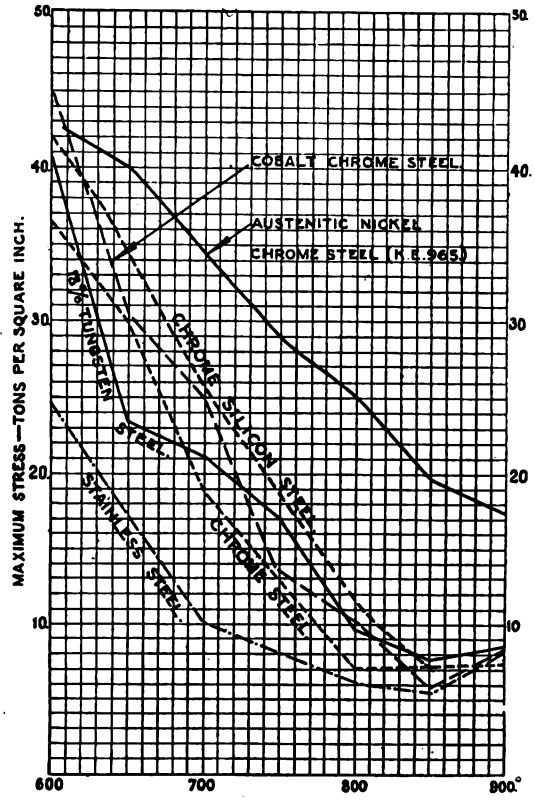
minutes. At the end of this time the test-piece was pulled while still hot, and in the furnace. Even when the test-pieces were put under load and kept there for a long period K.E.965 showed its superiority.




K.E.965 does not air-harden and even at remarkably high temperatures is not much affected by oxidation. Test-pieces have been heated to 1,000 deg. Cent. and kept at that temperature for five hours with no apparent loss of weight.

Although more power is required to produce a given alteration of section the forging of K.E.965 offers no particular difficulty. In fact there is not only little risk or defects but the proportion of faults is remarkably small. The lack of any air-hardening quality has much to do with this.

Valve forgings of K.E.965 steel are usually supplied already heat-treated. They have been normalised by being heated to 900 deg. Cent. and allowed to cool on the floor. For ordinary purposes the valves require no further heat-treatment after machining, but if they are to be used in an engine which will be highly stressed, a second normalising at 900 deg. Cent. with subsequent cooling on the floor is recommended after rough machining before grinding and polishing.

In this heat-treated condition the average test gives an elastic limit of 42 tons per sq. in. and a tensile strength 68 tons per sq. in. The elongation is 27 per cent. on 2 in.

There should be no difficulty in turning and milling provided the tool angle is kept acute. Drilling is a little difficult but this is minimised by the use of a short stubby drill which must have a good cutting clearance at the cutting edge.

As the Linear Co-efficient of Expansion of K.E.965 is rather higher than those for Nickel Chrome and Stainless Steels due allowance for this must be made in arranging the clearance in the valve guides. The Coefficient at 800 deg. Cent. is 0000186.

### THE CIRRUS HERMES MK. II ENGINE.

On Nov. 20 the Cirrus Hermes Mk. II engine completed a development Type Test which had as its object the re-rating of the engine at higher revolutions per minute.

The Test was over 100 hours and throughout the engine was run at 2,000 r.p.m. On the completion of this strenuous test the engine was run for a further period at 2,300 r.p.m.

The brake horse-power developed at 2,000 r.p.m. was 110 and at 2,200 r.p.m. an output of 117.5 h.p. was registered.

The petrol consumption averaged 0.59 pints per B.H.P./hour and the oil consumption 0.75 pints per hour.

After the test the engine was stripped down. It was found to be in excellent condition, the maximum amount of wear being .0005 ins. on the crankshaft bearings.

The following is a list of the principal accessories and components used on this engine during the test: Claudel-Hobson AV. 48.0 carburetter, Watford S.T. 4/1 magneto, K.L.G. F.15 sparking plugs, Kayser Ellison KE. 965 valves, Hoffmann ball-bearings, Midland Motor Cylinder Co. aluminium and iron castings, Hoyt white-metal die-cast bearings and Stanavo petrol and oil.

### INSTRUMENTS AND EQUIPMENT IN THE Do.X.

For inter-communication between the wireless operator and the navigation room and also the passengers' accommodation in the Dornier Do.X a complete Laryngaphone system made by the Telephone Manufacturing Co. (1929) Ltd. was installed. It will be remembered that the Aviation Laryngaphone head-set was described in THE AEROPLANE for Oct. 29. The system installed on the Do.X was what is known as the hand combination. This is largely in use on board ship, but the general principle of operation is similar to that used in the aviation head set devised by Capt. Gerald Deane in conjunction with the Telephone Manufacturing Co. Ltd. It is obvious that in a machine of the Do.X type flying helmets are unnecessary.

The essential instruments of the Do.X were made by the Pioneer Instrument Co. Inc., of New York, U.S.A., and were supplied by Autoflug Minh. Gerhard Sedlmayr, the German agent for the company. These instruments included the following: two Turn Indicators, two Climb Indicators with sensitive altimeters, two Gyro Pitch Indicators, one Altimeter reading from 0—1,500 m. and 1,500—3,000 m. in two revolutions of the dial, one Airspeed Indicator reading from 0—250 km./h., and one Autoflug telephone for three operators.

### AIR MINISTRY CONTRACTS.

In the House of Commons on Nov. 12, in reply to a question by Major Llewellin, the Under Secretary of State for Air said that he was aware that several companies and firms which had supplied material, specified to be manufactured by them in Air Ministry contracts, to a heating engineering firm now in liquidation, had been unable to receive payment for goods so supplied. The Air Ministry did take steps to ascertain the financial stability of firms with which it made contracts, but it did not intend to do anything to meet the accounts of such sub-contractors. Inquiries were made when the firm in question was placed on the Air Ministry list, but it would be impossible for the Air Ministry to guarantee the solvency of contractors in relation to the various sub-contractors with whom they might have dealings.

### A SAFETY DEVICE.

A point of merely casual notice about the airscrews of the Ford tri-motor aeroplanes which were described recently in THE AEROPLANE, was the triple band of colour painted on their tips. The suspected reason is now confirmed by an item from *Wings and N.Z. Motor Life*, of New Zealand.

The Vacuum Oil Company Ltd. has been making experiments in the colouring of airscrew blades for better visibility while running. Single colours, strangely enough, become invisible at high speeds of rotation, and many accidents have resulted from people walking into revolving and, therefore, invisible airscrews. The researches of this company have shown that bands of red, orange and blue, painted horizontally, with the orange in the middle, show up distinctly on the tips of the blades at any speed of rotation and clearly demark the dangerous area.

### THE FIRST MESSAGE.

On arriving at Tachikawa at 2.30 on a Monday on her way to Tokio, the Hon. Mrs. Victor Bruce, who had flown from England to Japan, as keen students of the daily papers may have perceived, sent the following cable to Sir George Beharrell, Managing Director of the Dunlop Company.

No trouble tyres or wheels. Not a puncture and never looked at tyres or wheels throughout flight.

Sir George Beharrell has cabled the following reply:—

Heartiest congratulations on successful outcome of your memorable flight which seems to me to transcend any achievements you have so far accomplished.

### PLUGGING ALONG.

Mrs. Victor Bruce, who has had every reason to congratulate herself on the performance of her Bluebird machine and Gipsy II engine, especially during a 600-mile flight over the Yellow Sea, has displayed less originality in her choice of sparking plugs than in her selection of route. No woman had previously flown from England to Japan, but the list of K.L.G. users is interminable.

For those who wish to follow her example—in the matter of plugs only—a folder has just been issued by K.L.G. Sparking Plugs Ltd. which lists all the current makes of motor-car, motor-cycle, commercial vehicle or marine engine, and recommends the appropriate type of K.L.G. plug. It is obtainable post free on request.

### RECIPROCITY.

A working arrangement has been concluded between the Italian Isotta-Fraschini company and the American Ford company whereby the former will build Ford cars for the Italian market and the latter the Isotta-Fraschini light aeroplane engine in the United States.

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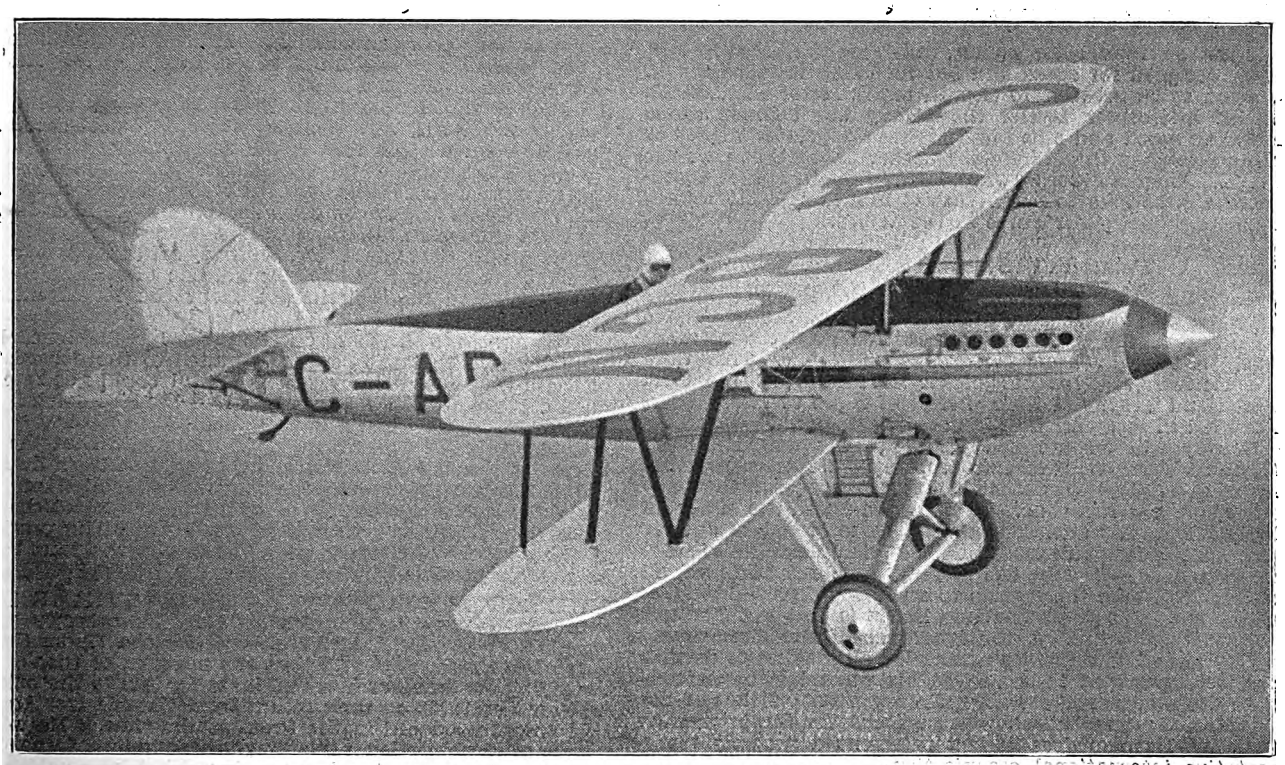


**FOR BELGIUM.—A Fairey Firefly single-seat fighter biplane (Rolls-Royce "F" supercharged engine), forty-five of which have been ordered by the Belgian Government.** —(*"Aeroplane" photograph.*)

### WORTH-WHILE CONTRACTS.

According to statements which have appeared in the daily Press generally, the H. G. Hawker Engineering Co. Ltd. is to be awarded contracts for aeroplanes to a total number of between 225 and 250 for the re-equipment of certain Royal Air Force squadrons and Fleet Air Arm units.

The Hawker Fury (*née* Hornet) has already been chosen as a standard Intercepter fighter, and it is likely that by the end of 1931 six squadrons will be equipped with the Fury. No. 32 (F) Squadron will be the first to be so equipped.

As announced in THE AEROPLANE last week, the Fury has been adapted for naval use, and as a Fleet fighter it has been adopted for re-equipment of certain fighter units of the Fleet Air Arm.

The Hawker Hart two-seat biplane has already been adopted as a Day Bomber by the R.A.F., and one squadron—No. 33 (B) Squadron—is already equipped with Harts.

The type has also been equipped as a two-seat fighter and as an Army Co-operation machine, and a number of Harts so equipped will be included in the forthcoming orders.

The versatility of the Hart has resulted in its choice as a two-seat Fleet fighter reconnaissance machine by the Fleet Air Arm, but the name for this version, which under the new system of nomenclature must begin with "O," has not yet been decided upon. Naturally, those of ribald mind suggest the 'Awker 'Ork.

There is also a strong rumour that the Hawker Tomtit is to be ordered in quantities as a training machine, because of its superiority in speed over other aeroplanes in its class, coupled with its maniability and its low landing speed.

### THE FIREFLY IN BELGIUM.

The Fairey Aviation Co. Ltd. has received an order for a series of 45 Firefly single-seat fighter biplanes (Rolls-Royce supercharged engines) from the Belgian Government.

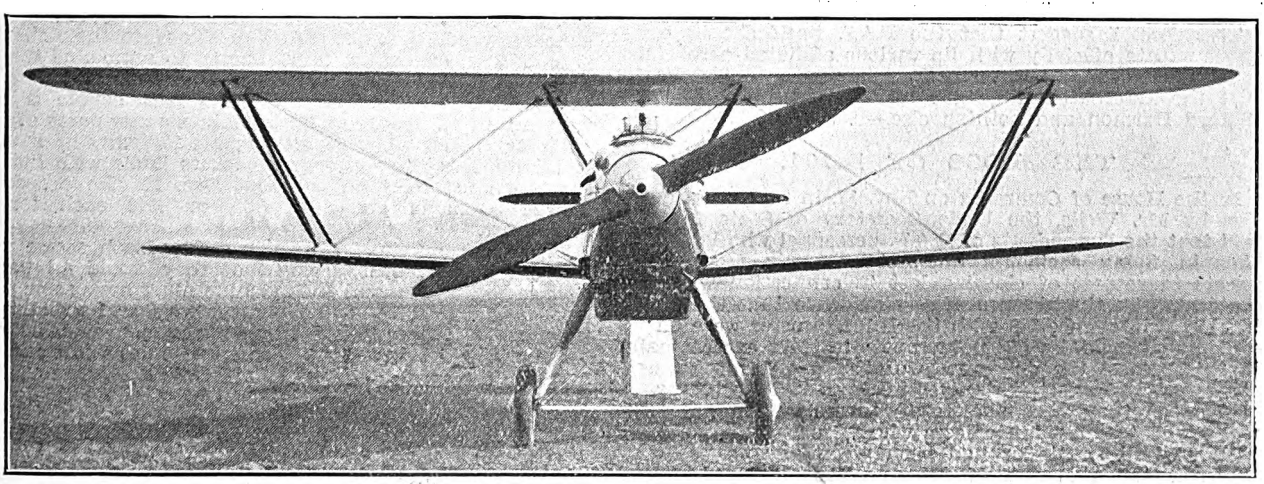
The Belgian Army Air Corps holds at regular intervals competitions to determine its choice of new equipment, and the most recent of these competitions was for single-seat fighters. This competition attracted a number of Continental high-performance single-seat aeroplanes, and it was not until the Fairey Firefly had been released by the Air Ministry towards the end of the competition that it was able to take part.

The Firefly was flown over to Brussels by Mr. C. S. Staniland, where it was demonstrated before the military authorities and put through its performance tests. In this respect it is interesting to note that the figures obtained by the Belgian authorities were superior to those claimed for the machine by the Fairey company. The machine remained in Brussels for three days, after which it was flown back to England.

It later returned to Belgium at the request of the authorities for Service test, and it was flown round all the military aerodromes. There it was flown by Belgian service pilots, all of whom spoke highly of its performance, manœuvrability and comfort.

When it had finished its full tests the Belgian Government decided that the Firefly was by far the most efficient single-seat fighter that had been submitted for test,

Actually, the Firefly, as submitted to, and finally ordered by, the Belgian Government is a normal single-seat fighter



**A NORNAMENT TO ANY NAVY.—The Hawker single-seat Fleet Fighter (Rolls-Royce F. engine), originally the Hornet, now the Fury, when used by the R.A.F. as a land-plane, and now adopted by the Fleet Air Arm under a name which was inadvertently disclosed last week but has now been put back on the Secret List by Their Lordships of The Admiralty.**

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and not an intercepter fighter, and with the airscrew specially designed for speed and not for climb the machine is claimed to be between 10 and 15 m.p.h. faster at 15,000 ft. As an intercepter fighter the Firefly was claimed to be faster in speed and climb and to have a greater degree of manœuvrability than any other fighter aircraft, so that the Belgian Army Air Corps, when it has its new fighter equipment, will be able to claim that it has the fastest fighter equipment of any Air Force in the World.

## AN INTERNATIONAL IMPERTINENCE.

From the Editor-in-Chief of that excellent Austrian paper *Flug* we learn that Mr. Clifford Harmon, the self-styled President of the so-called "International League of Aviators," has again been performing in public. This time Mr. Harmon and his hangers-on have awarded the Gold Medal and Trophy of their precious League to Herr Robert Kronfeld in recognition of his soaring flights.

Nobody will dispute the justice of the award. As an Austrian Herr Kronfeld has probably done more to make Austrian aviation prominent in the last few years than any other Austrian has done. He might be called the Hitler of Sailplaning. His achievements in the mere act of soaring are actually insignificant beside the scientific value of what he has done,—if only the aerodynamic scientists of all nations will take the trouble to study his discoveries. Our objection to this performance in Berlin is that Mr. Harmon, presuming as usual on the ignorance of the Government authorities of all countries concerning all matters to do with aviation, managed to secure at his presentation performance the presence of several quite important officials of the Austrian Government who were quite under the impression that Mr. Harmon does in fact represent a properly representative international organisation.

Nobody would object to Mr. Clifford Harmon if he were to present his trophies to the Aero Clubs of the various nations and were to ask those clubs to award his trophies with a full knowledge of the facts. Then we might be sure that the Harmon Trophy would be awarded by competent people to the person in each country who best deserved it. And everybody would hail Mr. Clifford Harmon as a generous patron of aviation.

In spite of the fact that nobody quite knows what to do with his enormous trophies when they have got them—because Mr. Harmon seems to believe in quantity rather than quality, which of course does make a more showy display—people would be glad to receive a trophy awarded to them by a competent authority. But when Mr. Clifford Harmon butts into countries which are no concern of his and awards these edifices to people who have been chosen by him and/or his hangers-on in Paris, he is distinctly committing an impertinence.

He does little actual harm, because the representative bodies of the various countries, which are affiliated to the *Fédération Aéronautique Internationale*, do not recognise him or his so-called League and consequently his awards cut no ice among serious aviation people. But he does bring ridicule upon a number of quite respectable officials in these various countries when he ropes them into his public antics while they are still under the impression that he represents an international body of considerable importance.

Probably these good official people have a vague notion that there is an international body governing the sport of aviation. Probably they have never heard of the *Fédération Aéronautique Internationale*, and consequently when Mr. Harmon comes along and talks about "The International League of Aviators," they really think that he is it.

Therefore, I suggest that the F.A.I. itself should communicate officially with its various affiliated aero clubs in all countries, and through them announce quite clearly that the International League of Aviators represents Mr. Clifford Harmon and nothing else.—C. G. G.

## THE LOSS OF R.101.

In the House of Commons on Nov. 17, in reply to a question by Mr. Wells, the Under-Secretary of State for Air said that the Dependants of R.A.F. personnel who lost their lives in flying accidents did not normally receive any grants in respect of clothing lost in connection with the accidents. In the absence of any evidence that the clothing losses in connection with the R.101 disaster were on an exceptional scale, he did not propose to treat exceptionally in this respect the dependants of the R.A.F. officers and other ranks who lost their lives in the R.101. The amount of luggage they were allowed to take had been severely restricted. The civilian officers who were lost in the R.101 had received grants or had been given advances of pay to cover the provision of kit and repayment of any of these grants or advances would not be sought. In addition the officers and civilian members of the crew of the airship had been provided with uniform on a repayment basis. In the special circumstances the recovery of the cost of the uniform would be waived

In the House of Commons on Nov. 19 in reply to a question by Mr. Wells, Mr. Whiteley (for the Under-Secretary of State for Air) said that if the Air Ministry made a reduction in the rents of the Air Ministry houses occupied by dependants of those who lost their lives in the R.101 the effect would be to pay compensation on a more liberal scale for some dependants than for others.

Replying to Mr. Malone, Mr. Whiteley said that it was not true that the father of E. G. Rudd, one of the victims of the R.101, had been discharged from the Royal Airship Works.

Replying to a further question by Mr. Malone, Mr. Whiteley said that the pensions granted to the dependants of those who lost their lives in the R.101 could not be paid until certain necessary formalities had been completed but advances had been made to meet immediate needs.

Replying to Sir B. Falle, Mr. Whiteley said that the relatives of the R.A.F. personnel who had lost their lives in the R.101 had been granted pensions calculated on the scale applicable to the case of death in action which was common to the Navy, Army and Air Force. The pensions to the relatives of civilians were likewise on the most beneficial scale possible.

## THE ATLANTIC VOYAGE OF THE R.100.

In the House of Commons on Nov. 19, in reply to a question by Mr. Mills, Mr. Whiteley (for the Under Secretary of State for Air) said that the message of thanks delivered by the late Secretary of State for Air to the officers and crew of R.100 on their return from Canada last August had been reproduced in the Press at the time. He would convey the suggestion of issuing a facsimile of the oral message to the crew to his Hon. Friend but he would point out that this crossing was not unique. There had been other crossings prior to this by other kinds of aircraft.

## A SUPPLY OF COMPETENT MEN.

As most people in the Aircraft Industry know, the Airship Station at Howden is being closed down because the Government has not yet made up its mind what it is going to do about airships, and the Airship Guarantee Company cannot afford to keep a staff of men doing nothing. This means that a number of exceptionally competent men are thrown out of work, and so one suggests to the managers of all firms in the Aircraft Industry that they should size up their own staffs and see whether some of the less competent people cannot well be replaced by more competent people from Howden.

In hard times such as these there is no excuse for employing incompetent people when competent people are available. And, in fact, one of the reasons for bad trade is that too many incompetent people are kept in their jobs by favour while competent people are looking for work.

Anybody in the Trade who knows Mr. V. N. Wallis, the designer of R.100, knows that there would be no chance under him or his chief assistant, Mr. N. S. Norway, for bad workmanship, either in the drawing office or in the shops. And anybody who has inspected the R.100 must have been impressed by the excellence of her workmanship.

We learn from the Airship Guarantee Co. Ltd. that a number of their stress calculators have already found jobs in the Aircraft Industry, but that they have had more difficulty in placing draughtsmen and foremen. Therefore any firms in the Trade who have vacancies for such men are invited to write either to Mr. A. Hessel Tiltman or Mr. N. S. Norway, C/o the Airship Guarantee Co., Howden, E. Yorks.

## CHEAP SEATS FOR INDIA.

As everybody does not read *The Times*, to their shame be it said, The Aeroplane is at liberty to announce that Mr. N. Vintcent, D.F.C., formerly of Cranwell and lately of the R.A.F., who has been for the past couple of years running an air transport business in various parts of India with Mr. C. Newall, is advertising the fact that he is willing to take one or two passengers back to India with him in a Puss-Moth, starting on or about Dec. 18. He proposes to charge a single passenger £65, or £40 each for two passengers.

Three people flying to India in a Puss-Moth seems rather like cruelty to Moths, seeing that they would all want to take some luggage, and the machine must have some petrol. But, presumably, by flying short stages and avoiding the long trans-Mediterranean stretch, the job can be done. Anyhow, Mr. Vintcent is certainly one of the best and most careful of pilots. His address is: C/o Miss Johnson, Sandways, Hunstanton, North Norfolk.

## TO-DAY'S GREAT THOUGHT.

Our valued Chicago correspondent, writing of the commercial slump in the States, says:—"Times are so hard that the gangsters now take their victims for a walk, to save gasoline."

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## THE ENQUIRY INTO THE LOSS OF R.101.

(*Continued from page* 1082.)

Sir John Simon returned to the subject of the reduction of the length of the trial but the witness maintained that there was no "rush" because rush involved something not being done that ought to be done.

Sir John Simon read the last sentences from Lt.-Cdr. Atherstone's diary: "There are very many unknown factors and I feel that the thing called luck will figure very largely in the flight." Sir John also read a minute from Wing Cdr. Colmore to Sir John Higgins, dated Oct. 16, 1929, suggesting that the fourth flight ought to be a duration flight of not less than 25 hours. "Does not that," he said, 'go to show that, apart from the responsibility of not wasting time, Colmore's view was that a duration flight of not less than 24 hours was not only a necessity before starting for India, but necessary in these early tests?"—The witness agreed.

Air Vice-Marshal Dowding agreed that one result of the curtailment of the final trial was that the airship did not get a full experience of flying equally by day and by night, and that the greater part of the abbreviated trial was by night. He added that when he was talking on the telephone to Colmore, who had intended to start rather later—about 6 o'clock, if he remembered rightly—he suggested that they should make an earlier start, so as to see the behaviour of the new envelope during daylight.

Sir John Simon.—That does illustrate, doesn't it, that whether for purposes of observing her behaviour, or for the purpose of getting an advantage out of varying conditions, there may be something to be said for 24 hours ,as opposed to a flight during the night only? The witness agreed.

Sir John Simon then read out the airworthiness certificate which was signed by the Deputy Director of Civil Aviation and stated:—"The Secretary of State for Air having regard to the reports furnished to him, issued the present certificate of airworthiness, dated Oct. 2, 1930.

Air Vice-Marshal Dowding said that he presumed that a report was furnished by Colmore and said that he imagined that the airworthiness certificate would not be given without regard to the trial. Sir John Simon pointed out that the certificate was given on the same day that the airship came back from the trial.

The Solicitor-General said that the final inspection of the ship had been made on the morning of Oct. 4 before the airworthiness certificate was handed over and that the inspection had taken Mr. McWade and an assistant about two hours. No written record of the inspection had been made before the crash but one had been made subsequently.

Mr. F. W. Musson, Secretary to the Air Member for Supply and Research, said that on Oct. 1 his chief, the Air Vice-Marshal, had told him that some suggestions had been made about curtailing the trial flight and that he had felt that it was unreasonable to ask him to curtail it because he had no practical experience of airships. Later Colmore had raised the matter in a telephone conversation with the witness and had said that there did not seem much object in continuing the flight once Scott was satisfied that the behaviour of the ship was satisfactory

Sir John Simon said that he would like to state publicly at this point, on behalf of the assessors as well as himself, that they were entirely satisfied that the very natural desire of Air Vice-Marshal Dowding to go on the trial flight, and the difficulty he would be in if it extended over 24 hours, had nothing whatever to do with the shortening of the time of the flight.

Mr. L. G. S. Reynolds of the Air Ministry was present at the interview between Lord Thomson, Air Vice-Marshal Dowding and Wing Cdr. Colmore. He was not sure of the actual words used, but his impression was that Lord Thomson had said that there was to be no rush on his account. The alternative methods of getting the Secretary of State back at any stage of the journey, in the event of the R.101 being held up, had already been discussed.

Before the public sitting on Nov. 7 a lecture was given on the construction of gas bags to the Court in a private room. When the sitting was resumed two French officers gave evidence.

M. Jouglard (head of the lighter than air section of the Technical Service of Aeronautics) said that he and the other French officers who had taken part in the preliminary inquiry in France were in agreement with the conclusions arrived at by the English officers and had signed the report. He and the other French officers had also made a separate report a copy of which he produced.

Sir John Simon said that the French report said that no part of the dirigible could have been detached before the accident. The report added that pieces thrown into the air by the explosion had been carried a considerable distance. Also that there was no ground for supposing any rupture in the machine before contact with the ground; that the position of the elevator controls at the moment of striking the ground was right up; and that the engines had functioned regularly until the end and were ready for any manœuvre.

M. Drunat, also of the French Technical Service, agreed.

Mr. J. W. Ward Dyer, fabric manager and chemist at Cardington, said that a sample produced in court was typical of the result of chafing in the gas bags of R.101.

Continuing his evidence Mr. Dyer said that all the bags were taken out between December, 1929, and March, 1930, and in addition bag No. 9 had been taken out after the R.A.F. Display and before the new bay was put in. There were numbers of holes caused by chafing. Generally speaking the bags returned to him in December, 1929, were in good condition. The bags had produced satisfactory results as far as the strength of the bags and the maintenance of gas-tightness was concerned. The skin lining was in good condition and the adherence of the skin to the cotton fabric was in good condition. They had found mould as they always would. The seams were in good condition. No. 9 bag had been taken out in connection with the lengthening of the ship. There was a tear in it about 4 ft. by 2 ft. He thought it quite possible that the tear was associated with the breaking of a bridle wire in the frame. He did not think that the rush of gas out of the tear would extend the rent. A case of the kind had occurred in September, 1929, when a rigger had put his foot through the top of bag No. 14 and made a rectangular tear about 3 ft. by 3 ft. The tear had not extended. Replying to Sir John Simon Mr. Dyer said that he believed that Col. Richmond considered these matters trifling.

Sir John Simon then read a letter addressed by Col. Richmond to Maj. Scott on July 2:—

"In connection with the reported loss of lift of R.101 during flight, I have been investigating the effect of holes in the gas bags. I find that if it be assumed that the average height of the holes is equal to three-quarters of the height of the ship, then the rate of loss of lift is about one ton per square inch of opening in 12 hours. This calculation assumes quite a pessimistic coefficient of discharge such as would be applicable to a triangular hole. In my opinion this result is somewhat startling and emphasises the great importance of guarding against holes in these present ships. Even though the holes are in the forms of splits which have comparatively little effective area of discharge, it seems quite conceivable that we may have had leaks in both ships amounting to four or five square inches area."

Sir John Simon remarked that that meant a loss of four or five tons lift. The Solicitor-General—In 12 hours.

The document went on:—

"In order to enable me and my staff to determine what shall be done to check holes in the present ships and also to guard their occurrence in future ships. I shall be glad if you could arrange to let me have full particulars of positions, approximate sizes, etc., of the holes found by the crew from time to time."

Sir John Simon said that on July 3, a letter was sent from the inspecting department. It was addressed to the Secretary of the Air Ministry, Adastral House, and was signed "F. McWade." That letter was in the following terms:—

"Confidential. H.M.A. R.101. 'Airworthiness of the Above Ship'—On June 26, 1930, I handed over the permit to fly dated June 20, 1930, valid until July 19, 1930. Owing to the modifications which have recently been carried out in the wiring system the gas bags are now hard up against the main longitudinals and rubbing very hard on the nuts of the bolts positioning the stirrup into which the tie-rods are screwed. Further, the gas bags fall very badly on the heads of the taper pins at the joints of the main and intermediate struts at the centre ridge girder ends.

"This matter, in my opinion, has become very serious, as the points of fouling occur throughout the ship and amount to thousands. Padding has been resorted to by wrapping fabric over the parts mentioned above, and this is the usually recognised method used in isolated cases. Padding to the extent now necessary is, in my opinion, very unsatisfactory because the bags move when the ship is in flight, and the padding becomes loose, and the projection complained of is again exposed.

"Although the gas bags have recently been reconditioned, and were in good order when placed in the ship a few weeks ago, there are now many holes in them. Where the fabric is wrapped round a point it may be difficult to know what is happening underneath the wrapping. I have in mind the corrosion question. The fabric will become damp, and in many cases wet, when the ship is in flight. Therefore there will be alternative process of wetting and drying of the fabric, which must be detrimental to the metal underneath.

"I am fully aware that to remedy the faults complained of is in the nature of a large undertaking, and it may be necessary to remove the bags from the ship. Until this matter is seriously taken in hand and remedied, I cannot recommend to you the extension of the present permit to fly or the issue of any further permit or certificate."

Mr. Dyer said that he had no previous knowledge of what Sir John Simon had been reading. Sir John Simon said that the Court would require to know why these documents had not been produced before.

The Solicitor-General said that the responsibility was his for not having the document looked up. It had been put on one side to be copied and had been overlooked.

Sir John Simon said the file contained the original of McWade's letter and a minute addressed to D.A.D. (Wing Cdr. Colmore). This had "Urgent" at the top, and read:—

"I shall have to submit the attached report from my inspector in charge, dated July 3, *re* gas bags of R.101, to A.M.S.R. (Sir John Higgins), but before doing so I should be much obliged if you would favour me with your opinion. The troubles referred to are no doubt well known to you, and it may be that you have already made plans to overcome them satisfactorily."

There followed the minute, read the other day, from Colmore back to Colonel Outram, on July 8:—"I feel sure that you will agree that we cannot accept as a matter of principle that gas bags in an airship should be clear of all girders, also I expect you will agree that we can accept padding as a satisfactory method of preventing holes forming in the gas bags from this cause. As far as we can trace at present there have been remarkably few nips in the gas bags of R.101, and the holes which have occurred are due to fouling girders. We have little doubt that padding will be a permanent remedy, and if this is accepted, then it is certainly not a large undertaking to put the matter right . . . ."

This was followed by the minute: "Discussed with Colmore, July 10. He is aware of the defects, and padding is the only expedient at the present time. The inspector in charge notified to see padding is complete and efficiently carried out." This was initialled by Bishop.

The last document in the file was dated July 11, addressed to the inspector in charge—in answer to his letter of July 3—and signed by Major Bishop. In this letter Major Bishop said he fully realised the necessity of avoiding the contact of projecting points with the gas bags and had taken the matter up with Wing Cdr. Colmore.

The letter said:—"As you yourself realise, it is impossible to alter the whole structure of the ship at this stage. The only expedient at the moment is to pad, and it is your duty to see that every point which may lead to damage is padded in a proper manner. Further, the periodical maintenance inspection should ensure that padding does not subsequently become ineffective and also at the

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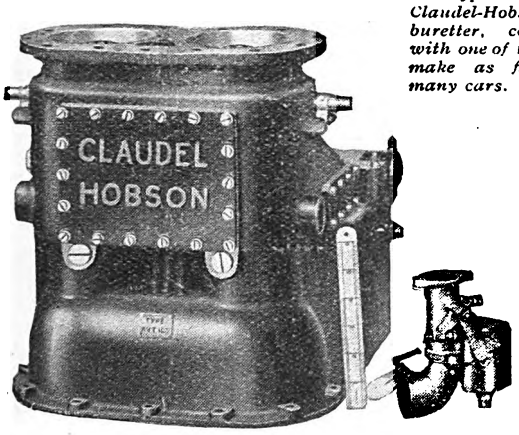


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same time the inspector should satisfy himself that the padding is not causing any alteration to the members by deterioration by corrosion. Should the nature of the padding prove ineffective, then the matter will have to be revealed in the inspection reports on maintenance, and D.A.D. will presumably take action to improve the method of padding should it be found that the present method does not overcome the difficulty experienced."

The letter went on to say that the D.A.D. was particularly anxious that all defects which occurred in the airship should be correctly logged in the inspection reports, together with reports on any modifications introduced, and their effect on the ship. The letter said:—"I will not enlarge on this at the moment, as I discussed it with you yesterday, but I do wish to impress upon you the necessity of maintaining a good record of all defects enumerated on the ship, in order that full opportunity may be taken in the flying of these ships during their experimental stage to bring all defects to light."

Sir John Simon said there had also been handed to him the rigger's rough log of R.101. On Nov. 11, 1929, when the ship was at the mooring mast, there was an entry: "Wind gusting up to 48 miles an hour; highest gust 81 miles an hour. Rolling of 6½ deg. . . . Valves of No. 8 were opening as ship rolled each side."

Lieut.-Colonel H. W. S. Outram, Director of Aeronautical Inspection, said that he was responsible for all material used in the aeronautical service. No call was made on anybody at Cardington between Oct. 1 and Oct. 4 to report anything about the gas bags or wires. Replying to a question about Mr. McWade's final inspection Col. Outram said that there was no such thing as a final inspection. The witness said that he regarded Mr. McWade as a most exceptionally experienced airship inspector. He agreed that Mr. McWade's views of a matter like this could not be lightly disregarded. The witness had sent McWade's report to Colmore with the request for information about how he proposed to get over the difficulty. The witness thought that McWade was more concerned about the matter from the inspection point of view,—the wrapping up of the joints made inspection difficult—than of the point of view of possible damage to the gas bags.

Replying to Sir John Simon, Col. Outram said that he had not submitted McWade's report to A.M.S.R. as after he had consulted Colmore he had been satisfied. Col. Outram added later that when he received McWade's letter he was very much concerned about it, but after discussing the matter with Colmore and making other inquiries from McWade by telephone he came to the conclusion that it was not so serious as he had thought at first. He never thought there was risk of losing gas. The holes would be so small that the loss of gas would not be important. The phrase about rubbing in thousands of places had made him take a serious view of it at first but when they came to investigate it they found that although there was the possibility of it occurring in many places it had in fact only occurred in comparatively few. The witness said that he had heard for the first time that morning that Col. Richmond had been investigating the effect of these holes.

Sir John Simon said that Col. Richmond had pointed out that the rate of loss in lift was about one ton per square inch in 12 hours and that it was quite conceivable to him that there might have been leaks to the amount of four or five square inches. That would mean a loss of four or five tons of lift in 12 hours. Col. Outram said that he was perfectly certain that he had never heard that Col. Richmond had minuted to Maj. Scott his anxieties. Even if he had known that Col. Richmond had written a minute on these terms he would not have taken any different action with McWade's letter because he was satisfied that the padding method had stopped the making of big holes.

Col. Outram asked if he might explain what was done with regard to the inspection of the ship. The shed trial inspection was in 1929, before the first permit to fly. Thereafter there was inspected every piece of work done on the ship, as it was done, and when they came to Sept. 30 there was no need, even if it were possible, for a complete inspection of the ship. The inspection had been carried on from week to week and they were satisfied.

Sir John Simon said he would be glad if Col. Outram could find the documents with regard to any inspection of gas bags or gas wires in the last week, which would cover the time the ship was out of the shed. They thoroughly understood that this inspection was going on to see that the material and the operations were, from the point of view of Col. Outram's department, satisfactory. They wanted to see what was done in his department which indicated any inspection after the ship came out of the shed on Oct. 1.

Mr. F. M. McWade, in charge of the inspection department at Cardington, said he had had 27 years' experience of airships. Replying to the Solicitor-General, he said that what he did on Oct. 4 was not an inspection. He need not have gone on the ship, because it had already been passed by his assistant, but it was natural, seeing that the ship was going on a long voyage, that he should see as far as he could whether everything was all right.

Sir John Simon.—It is not quite clear that what was referred to as a two-hours' inspection was not really an inspection at all? It was a friendly visit?—Yes.

The Solicitor-General explained that in saying "final inspection" at the previous day's hearing he had not meant a final inspection of the whole ship. He meant to imply an inspection of the final items. There had, of course, been a long running inspection.

Replying to Sir John Simon, Mr. McWade said that apart from the padding the conditions of things as he had described them in his letter were the same when the ship started for India. He had complained about the padding not being put on properly because he had found that at various points by rubbing his hand over the padding he could rub it off. The method of wrapping was not very good and there were so many points that ought to be padded that he did not think padding was much good. If the matter had been left to him he would not have given the ship a certificate of airworthiness.

Mr. McWade agreed with Sir John Simon when he said that proper allowance must be made for the fact that after her trial flight on Oct. 1 and 2 there were some two days and nights between getting back to the mast and starting for India. In that time, so far as Mr. McWade and anybody else at Cardington knew, those on the ship did not ask for any help towards maintaining the gas bags. The responsibility had really passed to the captain of the ship as she was now delivered from the works.

On the tenth day of the inquiry, Nov. 10, M. Louis Alphonse Maillet, a civilian caretaker of the Poix Aerodrome, gave evidence. He said he was awakened by the noise of the motors and saw the lights of the airship passing west of the aerodrome apparently at a height of 120 to 150 metres above the ground.

Careful questioning failed to shake M. Maillet's estimate of the airship's height, but Sir John Simon pointed out that too confident an assumption from this evidence would be dangerous because the witness had seen only the lights and did not at the time know the length of the airship. If true the evidence meant that the R.101 was less than half her length above the ground at that time.

Lieut.-Col. H. W. S. Outram was called and produced a number of chits which Sir John examined, and said that they were not what the Court had asked for. He wanted documents relating to the gas bags and their wiring. Mr. Wilfrid Lewis, Treasury Counsel, said that Mr. McWade was in Court with the other documents, and these were accordingly produced.

Then followed a particular inquiry into the inspection of the gas-bags and valves. Mr. McWade said, in reply to a question, that the inspection department was called in and gave a "chit" to cover any structural alteration, but was not responsible for routine inspection during service. He also said that his opinion on the condition of the bags, stated in a etter, did not seem to be shared by Wing Cdr. Colmore, but that the subsequent action, or lack of action, was not because he himself had changed his views.

Lt.-Col. Moore Brabazon asked whether all the valves would be expected to act as did the one reported on by a rigger after the airship rode out a storm at the mast in November, 1929. This one opened when the ship rolled six degrees. Mr. McWade thought that every valve might be expected to open at each such roll but was unable to say whether they actually had.

Mr. G. R. Raisbeck, of the Cardington Inspection Department, said he was detailed to go on the trial flight of Nov. 1-2. So far as he could see everything was satisfactory and Flt. Lt. Irwin had been satisfied when his report agreed with that of the crew.

Capt. G. F. Meager, first officer of the R.100, had been on the R.101 for the flight at the Hendon Pageant. He gave evidence that he dropped half a ton of ballast during his watch from 16.00 to 18.00 hours and said that there was difficulty in keeping height. He put it down to chafing of the gas bags, but talked with Flt. Lt. Irwin and gathered the impression that the valves were at fault. When the airship approached the mast about eight tons of ballast were released and the coxswain said that 15 to 20 degrees of vertical helm—almost the maximum—were needed to keep the nose from dipping. Capt. Meager replied to questions and said that these conditions should not exist in a reasonably gas-tight ship.

Sq. Ldr. Nixon, Assistant Director of Organisation at Cardington, said he was unable to find any copies of note books left by Flt. Lt. Irwin later than May, 1929. Wing Cdr. Colmore had told him on Oct. 1 that Lord Thomson had decided to go and was insistent on the necessity for starting on Friday night. Wing Cdr. Colmore wanted everything ready before that time but said he was going to try and delay the start until Saturday so that the officers and crew could thoroughly inspect the ship. Major Scott had said on the evening of the start that he wanted to get away early because the barometer was falling.

Mr. Lewis asked the witness if Wing Cdr. Colmore was the sort of man to take the risk of authorising a start if things were not really fit, and Sq. Ldr. Nixon replied very definitely that he was not, and Sir John quoted from documents in support of that opinion.

After some discussion of arrangements which had been made for re-inflation at Paris and Tours in case of necessity, Sq. Ldr. Nixon said that he did not know whether Sir Sefton Brancker had anything to do with the decision to start on the Saturday.

Sq. Ldr. Booth, commander of the R.100, said that the altimeter of the R.101 was set at 200 ft., the height of the control car above sea-level. He also said that conditions had been very bumpy on the trial flight the day before the Hendon Pageant. He noticed that the ship seemed to be getting heavier than was warranted by the conditions of temperature and pressure and that the loss of gas was quite abnormal. After the insertion of the new bay Flt. Lt. Irwin had told him that he hoped to have 36 to 48 hours for a thorough test. R. 100, for instance, had developed after 45 hours on a trial flight defects that would have hampered the ship seriously had they occurred over mid-Atlantic.

In reply to questions Sq. Ldr. Booth said that Major Scott and other experienced officers seemed quite satisfied with the ship, but he thought that if the Imperial Conference had not been in session, and the journey of the airship to India with the Secretary of State a desirable demonstration, they would have insisted on further trials.

Sir John Simon read from Col. Richmond's diary of June 27 some extracts which referred to a steep dive, and the necessity of sudden helm to counteract it which had snapped a lifting bridle on the starboard side. Sq. Ldr. Booth said that this had happened. A jerk was felt when the bridle snapped. On that flight the loss of list was represented by 9½ tons of ballast and two tons of fuel, which was quite abnormal.

Sq. Ldr. Booth told Col. Moore Brabazon that the R.100 was the most stable airship in which he had yet flown. He also replied to Prof. Inglis that R.101 could never have got to India in the condition in which she was during the Hendon Display flights. He also expressed the opinion that a gradual loss of gas would have been realised by the experienced officers on board and that something sudden must have occurred. Sir John Simon suggested that a gradual loss of gas might have been followed by something sudden.

Mr. T. S. D. Collins, Royal Airship Works, Cardington, the head of the stressing department, described the gas bag wiring system and gave evidence that modifications were made to give more lift.

Sir John Simon then announced an adjournment of the Court of Inquiry until Dec. 3, and said he would be glad if Sq. Ldr. Booth and other experts would consider the possible causes of the events that were now established by evidence as having occurred. He said that the method of elimination was the most promising.

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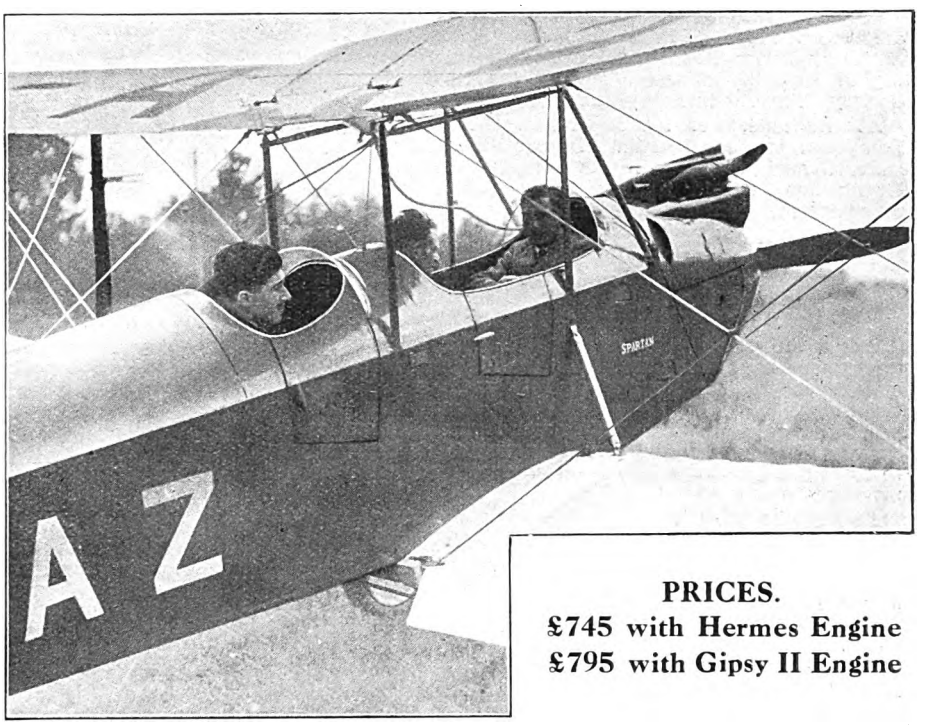


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# COMMERCIAL AERONAUTICS.

## THE ANNUAL GENERAL MEETING OF THE G.A.P.A.N.

The Guild of Air Pilots and Air Navigators of the British Empire held its first Annual General Meeting on the evening of Nov. 24, at the offices of the Royal Aeronautical Society. Mr. A. G. Lamplugh presided.

At the outset of his report on the year's work, Mr. Lamplugh expressed doubt whether any similar body had suffered such disasters in its early existence as had the Guild; but he said that it was nevertheless stronger in membership, keenness and funds than it had been at any time before.

The substance of Mr. Lamplugh's report was as follows:—

The profession of civil air pilot is growing steadily in importance, and the Guild is modelled as far as possible on the lines of the Company of Master Mariners.

The membership has shown a satisfactory increase to its present number of 103. The Guild demands extensive experience for the honour of full membership because transport history of every kind has shown that the experienced man is safest. The second grade, known as Associate Membership, has been inaugurated during the year to meet the need of a less exacting qualification for limited privileges of the Guild.

As a pilot's work in England is often a seasonal vocation an employment bureau was started in 1930 and has been in operation in a way which gives good promise of usefulness. Several firms of aircraft constructors have asked to be placed on the list for information.

The Guild hopes before long to establish its own library, but meanwhile arrangements have been made with the Royal Aeronautical Society that the library of the Society at 7, Albemarle Street, may be used by Members and Associates on inquiry and request. The Guild records its thanks to the oldest aeronautical body in the World for this privilege.

One of the chief duties of the Guild is to see that the professional training of the commercial pilot keeps pace with the importance of his duties. Lord Thomson, approached on this matter, formed a sub-Committee to examine the whole position and report to the Air Ministry. The main lines of the recommendation will be that an Imperial School of Air Pilotage be set up, of which the degree shall mark the highest standard obtainable by air pilots and shall signify thorough training in practical air pilotage and navigation, seamanship, maintenance of equipment, operations, traffic, meteorology, economics of air transport, and international legislation. It would, in short, become a civil Central Flying School and civil Air Staff College in one. The course recommended will be one of two years, with entrance for picked pilots only, whether English, colonial or foreign.

During the past year two classes in Air Navigation have been held with the help of the Air Ministry, and the lecturers, Mr. Collins and Captain Entwhistle. Classes outside London will probably be organised during the winter.

The whole question of pilots' licences has received a great deal of time and thought. The Guild urges that only B licences should entitle the holder to do remunerated work as a pilot and that A licences be endorsed for amateur purposes only. The Air Ministry is unwilling to take definite steps at present until the International Commission on Air Navigation determines the meaning of the term "aerial work."

The restriction of the B licence to certain named types of aircraft was taken up by the Guild, and the Air Ministry will shortly issue a new type of licence which will authorise the holder to carry passengers or goods for hire or reward, and to fly all other types "for industrial purposes."

The Guild has reviewed the conditions leading to Master Pilots' licences and recommends an increased minimum of flying hours and a period of ten years' service. The issue of civil pilots' licences to R.A.F. personnel while on leave has been strongly opposed during the year on the ground that the civil pilot is thus deprived of a legitimate livelihood. [And why should not a Service pilot on leave or on half pay earn a little money honestly, to augment his paltry stipend? Is a Naval Officer barred from holding a Master Mariner's ticket so that he may navigate his own or a friend's yacht? Is the G.A.P.A.N. going to start by being a Trade Union instead of a Guild of gentlemen adventurers?—C. G. G.]

Certain changes in the A licence tests have also been recommended.

Early in May a Charter was prepared for a Canadian branch and went to Canada on the R.100 in charge of Commander Atherstone. Negotiations were in a promising state, but received a severe set back at the untimely death of Commander Atherstone and Sq. Ldr. Johnston. Possibilities in Africa and Australia are also being considered.

Arrangements have been made whereby members of the Guild may insure against loss of licence, and the policy also covers legal costs.

During the year the question has often been raised of the publication of findings from accident inquiries. There is considerable doubt whether the cause of the accident at Meopham will ever be known definitely, which is very disturbing. The Air Ministry have said that reports of ordinary accident investigation shall not be published. The Guild feels that publication would be in the interests of aviation generally. The custom of blaming the pilot is increasing, and blame can only be assessed justly by a court of skilled and active pilots, who are seldom consulted in practice.

A private fund has been started to commemorate the work of the late Sq. Ldr. Johnston in air navigation by annual presentation of a prize for the best feat of civil air navigation.

During the year Mr. W. L. Hope has been nominated as representative of the Guild on the Council of the British Gliding Association. [What on Earth has the G.A.P.A.N. to do with aerial tobogganing?—C. G. G.]

The Guild's policy is to press for representation on bodies to investigate accidents, and notes with satisfaction the appointment of Lt.-Col. Moore Brabazon as one of the assessors in the inquiry on the R.101.

The danger to aviators of electric power cables has previously been noted. Close liaison now exists between the Central Electricity Board and the Air Ministry with a view to reducing this danger. The Guild feels that the discovery and introduction of improved means of flying in fog and poor visibility is urgent, and although the necessity for high tension cables and wireless masts is realised, their very real menace is also recognised.

The Guild has been represented in legal proceedings during the year as follows:—(A) The Meopham inquiry (still pending). (B) Capt. Crossley's appeal against a conviction for low flying, in which a Member was asked to advise the Bench on methods of estimating height. The conviction was quashed. (The defendant was not a member of the Guild, but the case was deemed important enough for action.) (C) The R.101 disaster. (D) The accident to an Imperial Airways liner near Boulogne.

The disaster to R.101 on Oct. 4 deprived the Guild of four senior members, including its first Master, Deputy Master and founder. The work of Sir Sefton Brancker for the Guild was beyond all words of praise, and its rapid growth in membership and influence is directly traceable to his energy and enthusiasm. Its immediate recognition by the Air Ministry was entirely due to him.

In Sq. Ldr. Johnston the Guild lost its Founder, and in Lt.-Comdr. Atherstone and Mr. Giblett it was robbed of valuable counsellors and friends.

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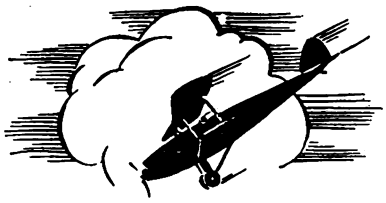

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friends, and Sq. Ldr. the Rt. Hon. F. E. Guest has consented to occupy the position of Deputy Master at the invitation of the Court and became a co-opted member of the Court on Oct. 29.

Mr. Lawrence A. Wingfield, Clerk of the Guild, announced that Lord Wakefield, Mr. Norman Holden, Sq. Ldr. Guest and Sir Alan Anderson had agreed to become Honorary Wardens and to subscribe £50 a year for five years. Donations of £100 from Lord Weir and £50 each from Mr. A. E. Guinness and Mr. C. R. Fairey have also been received. The total endowment fund was now £383.

The following were elected to vacancies in the Court: Sq. Ldr. Guest, Flt. Lt. G. Birkett, Mr. H. H. Perry, Sq. Ldr. R. de Haga Haig, Sir Alan Cobham, Capt. N. Macmillan, Capt. F. Tymms and Mr. A. S. Wilcockson.

Nine pilots were sworn in to membership of the Guild. They were: Flt. Lts. T. Rose, M. H. Findlay and R. L. Bateman; Messrs. H. B. G. Michelmore, C. B. Collins, R. A. C. Brie, G. E. Lowdell, and P. Bailey.

### CIVIL AIR NAVIGATORS' LICENCES.

The following candidates have been successful in the examination for Second Class Civil Air Navigators' Licences held at the Air Ministry on Oct. 7, 8 and 9: Flt. Lt. R. A. Seaton, Flg. Offs. C. E. Kay, R. O. O. Taylor, and G. M. Randall; Sjt. Plts. J. W. L. G. Brent, W. Jenkins, and A. R. McMillan.

The subjects of examination were International Legislation, maps and charts, meteorology, dead reckoning and direction finding by wireless, the Earth's magnetism and compasses and visual signalling.

Candidates were required to get 70 per cent. of the aggregate marks with the exception of visual signalling, and not less than 60 per cent. in any one subject also with the exception of visual signalling. In that particular subject a minimum of 90 per cent. is needed to qualify.

The next examination for this licence will be held some time in March, 1931.

### THE IRVIN QUICK-RELEASE HARNESS.

Up to the present parachutes have not been used in the Fleet Air Arm of the R.A.F. because of the obvious difficulty of getting out of the present type of harness should an aeroplane or a seaplane overturn after alighting.

The personnel of the Fleet Air Arm were against wearing any sort of a parachute equipment from which they could not release themselves quickly. This difficulty has always been recognised by Mr. Leslie Irvin, but to retain the riding qualities of the Irvin type harness he had to perfect a new design of harness that would retain all the riding qualities of the old type and still have one-point instant release.

The main principles of the new harness, which has now been adopted in the Fleet Air Arm, are as follows:—

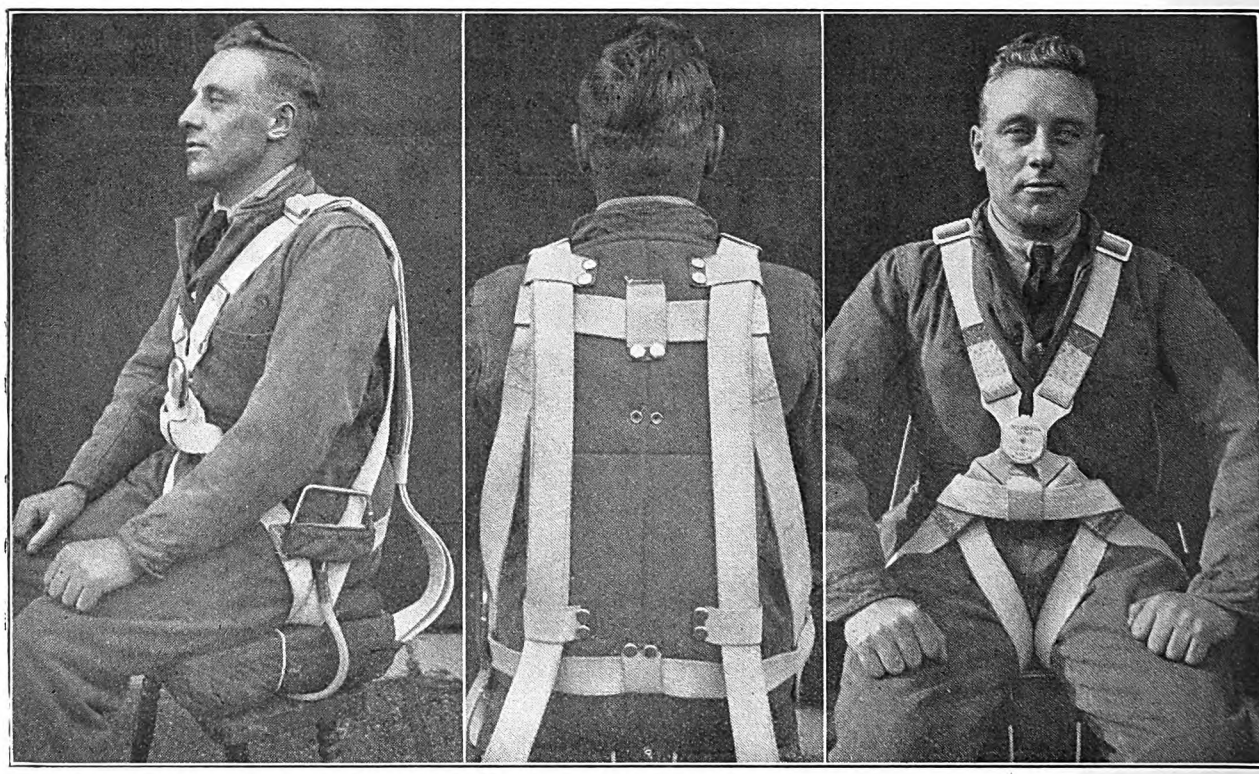
The same seat-straps, back-straps and leg-straps are used as in the standard type, but these have been so designed that they are all connected together at one point in front of the wearer. Should he wish to remove himself from the harness he has only to turn and release one fitting, and then he is free of any straps connected to the harness.

Another feature of this new harness is the fact that a back-pad which holds the harness in shape makes getting into the harness after getting into the aeroplane much easier. In other words, the parachute can be put in the cockpit and then the pilot can get into the harness in the aeroplane much more easily than he could put on his harness before entering the plane.

This new type harness can be used with Seat, Back and Quick-Connector Type Parachutes, and there is no increase of weight.

This new harness has been found to be more comfortable to wear, and with the new type of webbing, which is much softer than the old type, there is no doubt that it will become standardised in the future for all types of aircraft.

Exhaustive tests have been made by the Air Ministry, and they have placed a substantial order with the Irving Air Chute of Great Britain Ltd., of Letchworth, Herts., to equip the Fleet Air Arm immediately. This new type of harness has been very favourably received in various European countries, and substantial orders have been given by foreign Governments.



**QUICK RELEASE.—The new Irvin Quick-Release Parachute Harness adopted by the R.A.F. for the crews of sea-going aircraft. To release himself from the harness the wearer has only to turn and release the knob shown in the centre of the right-hand figure.**—*(R.A.F. Official photograph.)*

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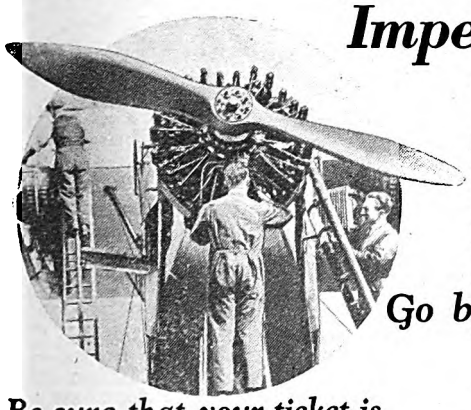

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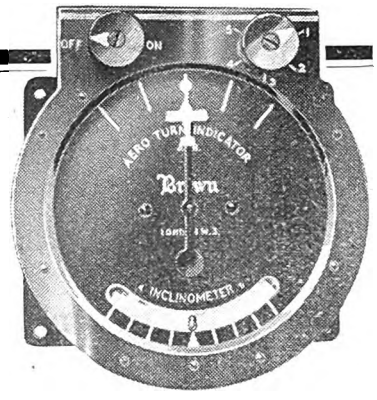


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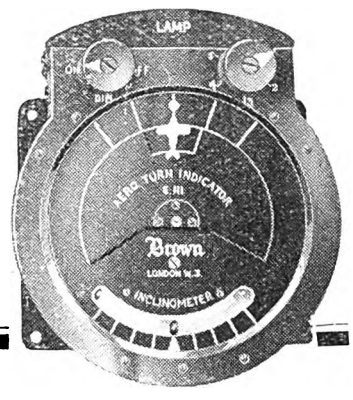


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### HOME FROM ROME.

Mr. T. Neville Stack, who returned from his trip to Italy with the Segrave Meteor (two Gipsy IIIs) last week, wishes to convey through THE AEROPLANE his thanks to everybody in Italy for the immense amount of hospitality and courtesy that was shown to him.

The whole trip seems to have been a great success. The officers of the Regia Aeronautica, from General Balbo downwards, were intensely interested in the Meteor, and many of them expressed their admiration of it after having flown it. After Mr. Stack had demonstrated it, General Balbo himself insisted on flying it, and took it off with Mr. Stack and two of his own officers on board, all above the average size, so that the machine had a very full load. In spite of this, and although he had never handled the machine before, General Balbo took it off in a masterly manner, flew it across country to a neighbouring aerodrome, himself demonstrated it there to the officers at that aerodrome, and flew it back with equal skill and address. Evidently he is equally able as a pilot and as an Air Minister.

Like all very fast machines the Meteor needs careful handling near the ground,—that is to say, she is not a novice's machine by any means. But General Balbo handled both the get-off and the landing with a fine combination of dash and confidence. Various Italian test pilots, including the famous Colonel Bernardi, also flew the machine, which rather astonished them with its performance with only a little over 200 h.p.

A very agreeable factor in this trip is that though Mr. Stack is definitely in the employ of S. Smith and Sons (Motor Accessories) Ltd., the famous makers of aircraft instruments, he was lent willingly by Mr. Gordon Smith to the Aircraft Investment Corporation, the owners of the Meteor, for this job. Cordial co-operation of this kind is an excellent thing for the British Aircraft Industry, and we can only hope that Smith's Instruments may profit by the trip equally with the proprietors of the Meteor.

Mr. Stack was particularly struck by the friendliness and hospitality with which he was met in the various Officers' Messes of the Regia Aeronautica which he visited. On one occasion he called at a particular Mess to meet a certain officer by appointment and walked into the Mess as a complete stranger. He was immediately accepted as a brother officer by the numerous young officers in the ante-room though they had no idea who he was, other than that he was a British aviator. When his host arrived and explained they became the more keenly interested in the Meteor.

### A PUSS-MOTH FOR THE PARIS SHOW.

The De Havilland Aircraft Company Limited, always foremost in enterprise, announce that they are exhibiting, on the stand of the Morane Saulnier firm at the Paris Aero Show, a Puss-Moth cabin monoplane. The machine will be finished in cream and red, and will be of the latest type. Mr. H. S. Broad, A.F.C., who is well known throughout Europe as the D.H. test pilot, will be in charge of this exhibit, and as he did nearly all the test flying on the original Puss-Moth visitors will be able to obtain information as nearly "straight from the horse's mouth" as it is possible to get it.

The employment of such a well-known pilot as Mr. Broad as a showman is an innovation, and his "sales-talk" [*Discourses de vendage,* not *sâles discourses,* one hopes.—ED.] should provide a welcome relief from the psittacine patter of the average salesman. A crowd of visitors may be expected to enjoy aerodrome conversation, in at least six languages, with Mr. Broad, and, of course, most of them will buy a Puss-Moth at the end of it.

### PERSONAL NOTICES.

DEATH.

CHANCE.—On Nov. 19, at Catterick, Yorkshire, as the result of a flying accident, John Anthony Chance, Pilot Officer, No. 26 (Army Co-operation) Squadron, R.A.F.

Mr. Chance was educated at Eton and entered the R.A.F. College, Cranwell, in 1928. At Cranwell he was Captain of Rowing, Beagle Whipper-In, President of the Debating Society and was also a keen boxer. He passed out of Cranwell in July 1930 and was posted to No. 26 (Army Co-operation) Squadron, R.A.F.

BIRTHS.

FESTING-SMITH.—On Nov. 19, at Heliopolis, Egypt, to nne, wife of Flg. Off. Patrick de C. Festing-Smith, R.A.F.—a son.

TRAVERS.—On Nov. 19, at High River, Alberta, to Marian (*née* Sherwill), wife of Charles T. Travers, R.C.A.F.—a son.

FORTHCOMING MARRIAGES.

HYDE—POLLOCK.—The engagement is announced between Flt. Lt. Alexander Arthur Clarendon Hyde, R.A.F., only son of the late Major A. Clarendon Hyde, and Miss Katherine Pollock, elder daughter of Mr. and Mrs. William Pollock, of Ireton House, Highgate, and Ardmore, County Waterford.

KNOX—ROBSON.—The engagement is announced between Brian Wright Knox, R.A.F., youngest son of the late Capt. S. W. Knox and of Mrs. Knox, of Glenburn, Dunmurry, Co. Antrim, and Diana Mary, second daughter of Sir Herbert and Lady Robson, of Westalls, Burnham, Bucks.

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All advertisements for this column should arrive at this office by first post Monday, to ensure insertion.

For the convenience of Advertisers replies can be received at the office of THE AEROPLANE, Cannon House, Pilgrim Street, London, E.C.4.

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**For Sale—D.H.53,** Bristol Cherub Mk. III, Machine 75, Engine 12 hours, C of A., excellent condition, complete with set of spare wings, ailerons, undercarriage, tail unit—£180. Royal Aircraft Establishment, S. Farnborough, Hants.

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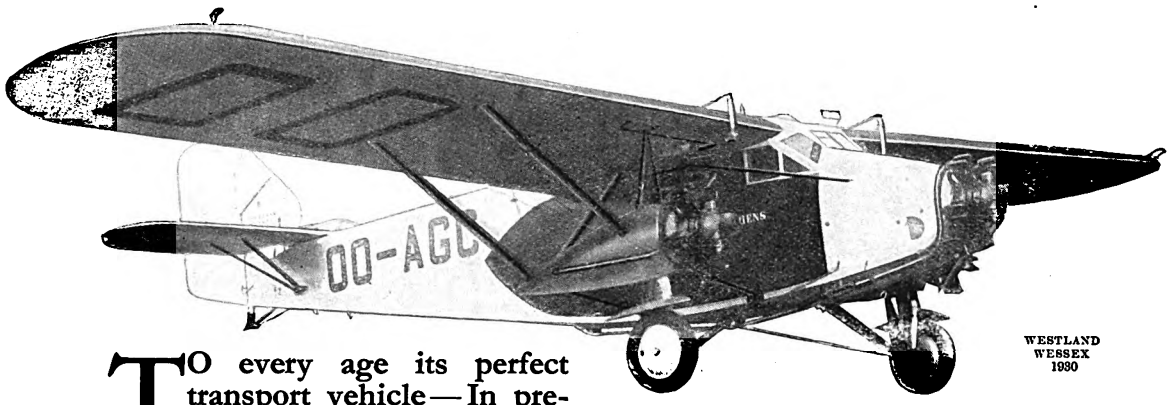


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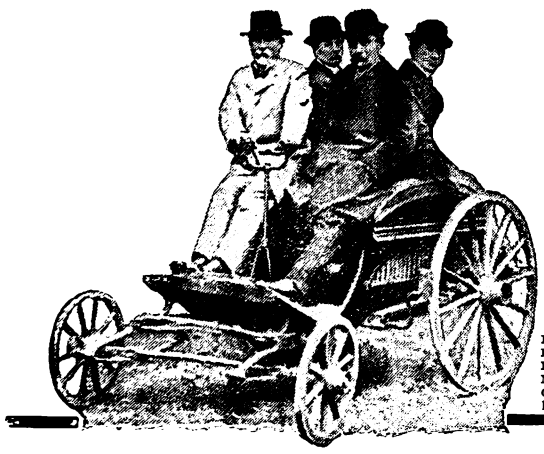

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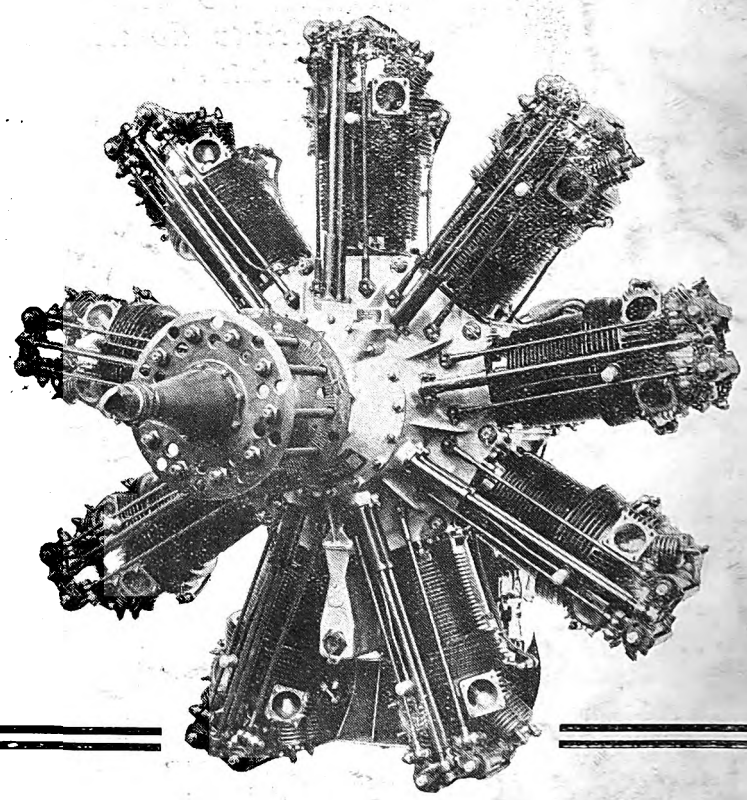

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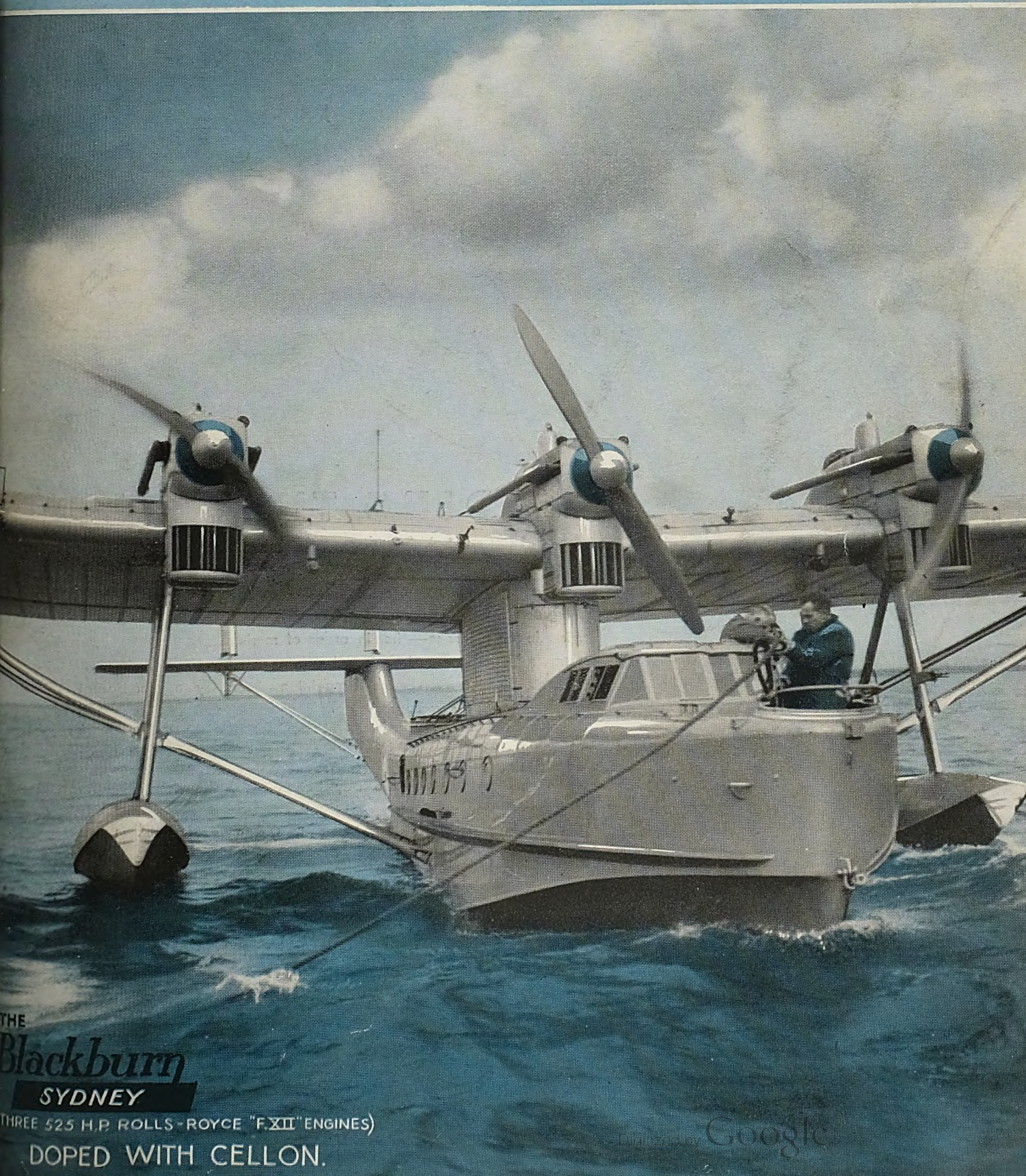
Edited by C.G.Grey

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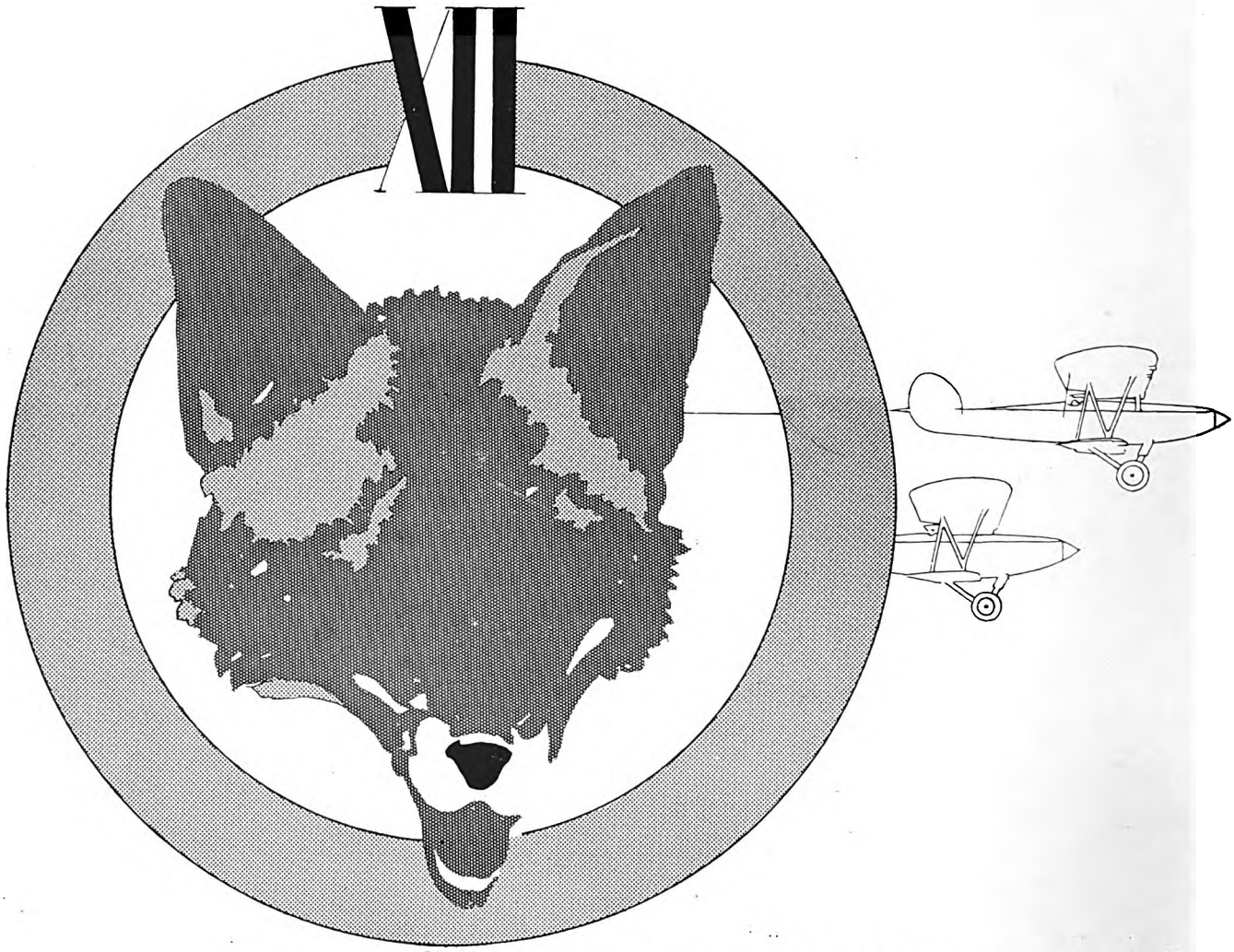


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Extract. "The Aeroplane," October 15th, 1930

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VOL. XXXIX

No. 24.

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## ON THE AERO-SHOW IN PARIS.

Within a few weeks of twenty-two years ago (to be exact, in December 1908) I had the pleasure of writing the report for *The Autocar*, of the first Aero Show ever held. And it was held in the same Grand Palais in which the thirteen succeeding French shows have been held. By a quaint coincidence, the first man I met after entering the *Grand Palais* on Nov. 27 this year was one Harding, to whom I owe the fact that my first aero-show report went down so well with the authorities of *The Autocar* that I was detailed to deal with this silly flying business for that distinguished paper, with the result that *The Aero* was started in April of 1909,—from which THE AEROPLANE descended in 1911. And I have never decided whether the World and I owe a debt of gratitude to, or a grudge against, Harding for that introduction to aviation.

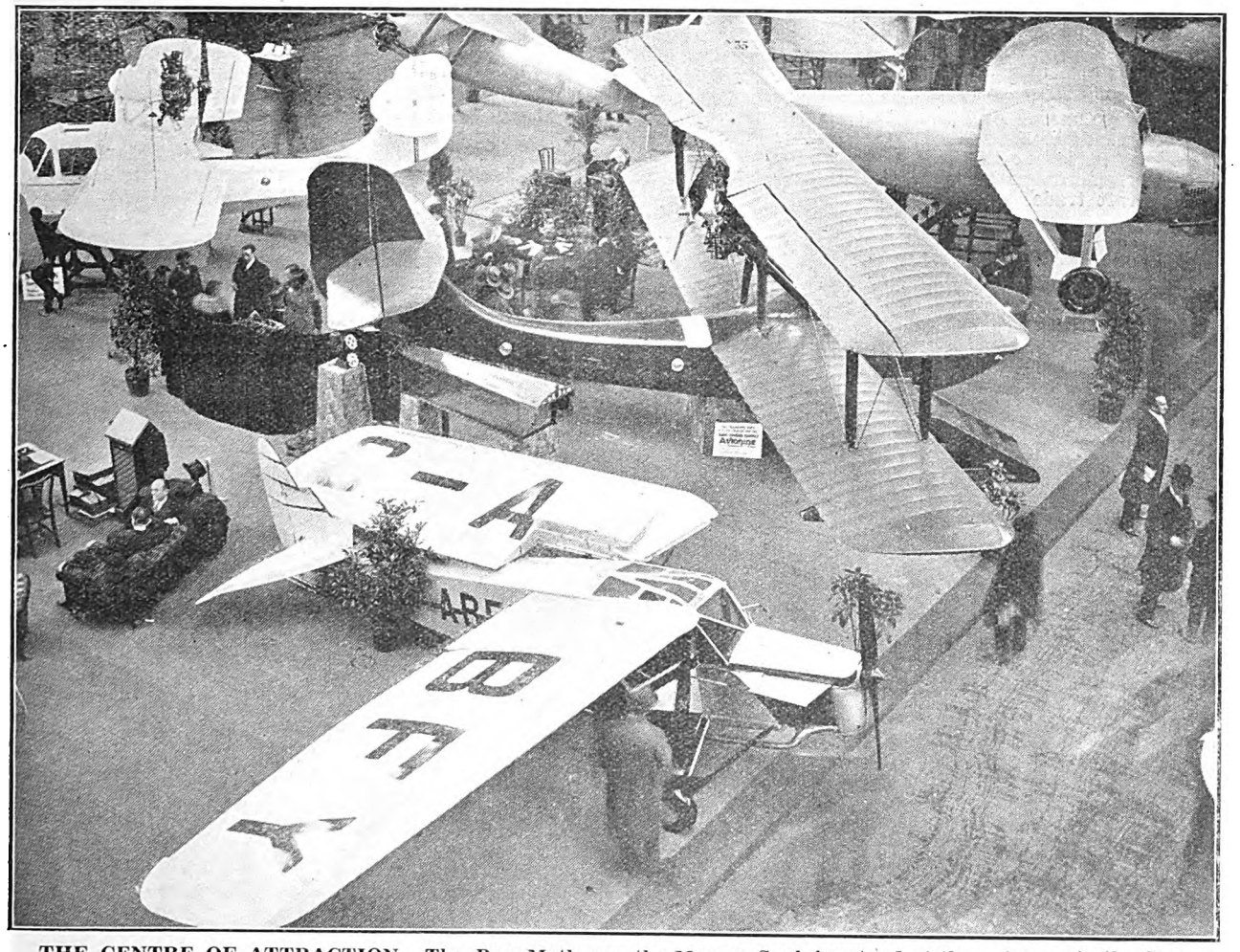
When I went to that show I knew only schoolboy French, and nothing about flying. As I stood gaping at a model of the Vaniman balloon, which ultimately fell in flames into the Atlantic off the coast of New York, a man behind the counter said to an enquirer,—"Moosire Vaniman ay just party, il ne sera pas ici pour un autre oor."—I understood that, so I knew he must be English.

He took me all round the show. He interpreted all my questions. He explained why the upper surface of an aeroplane lifts twice as much as the lower surface, or more,—which a lot of people do not know to-day. And fortunately so few people in England in those days knew anything at all about aerodynamics that on the strength of what he taught me, I was able to set up as an authority on aviation.

The rest of what I picked up I learned mostly from Horace Short, Howard Wright and W. O. Manning, who were already building aeroplanes in England in those early days,—in the railway arches under Battersea Station,—and from José Weiss, whose bird-like monoplanes were gliding better from Amberley Mount twenty-two years ago than any of the aerial toboggans in England are gliding to-day.

And, judging from the majority of the aeroplanes in the *Grand Palais* to-day, although there has been remarkable progress in aeronautical engineering, so that we now make aeroplanes of steel and duralumin, and although there has

"BE NOT FORGETFUL TO ENTERTAIN STRANGERS, FOR THEREBY SOME HAVE ENTERTAINED ANGELS UNAWARES."—HEB. XII, 2.




THE CENTRE OF ATTRACTION.—The Puss-Moth on the Morane-Saulnier stand at the entrance to the Show just before the opening. After the Show was opened there was a continual stream of interested people inspecting it. The bush which was carefully arranged to hide the British registration lettering is evident in the picture. But seen from the gallery it stood out clearly.

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been still more remarkable progress in internal combustion engineering, so that we get a full horse-power for one pound weight of engine (sometimes), hardly any progress seems to have been made in pure and applied aerodynamics. At any rate the Paris Show ought to be enough to convince anybody that there is no such thing as an exact science of aerodynamics, for no two designers seem to agree on things which ought to be fundamental axioms if there were any real knowledge or any fixed facts.

### THE CONSOLING THOUGHT.

There is always one thing about a Paris Aero Show which simplifies the describing of it,—that is, an Englishman who runs an aviation paper can always say what he really thinks about it. If one goes to America, or to Germany, or to Sweden, everybody is so perfectly charming and so hospitable that if one were critical of their show one would feel that one was being ungrateful to kind friends. And where other countries are concerned, if one should be critical one is apt to be dropped on by the entire British Aircraft Industry because one has offended prospective customers. But France is different.

In all the twenty-two years since I reported that first show I have never had reason to feel indebted in the slightest degree to the people who run the French shows. Even in England, for all our proverbial casualness, amounting to boorishness, when we do have an aero-show, once in a decade or so, we have the commercial sense, or perhaps even the courtesy, to invite foreign aviation papers to come to see it. And at our last show (last year) the promoters even went to some trouble to recognise the fact that foreign newspaper men were present. But not so the promoters of the French shows.

For a month or two before the show the foreign newspapers receive at intervals a few badly-composed circulars which are intended to provide material for puff-paragraphs, but they hold little that is of any real interest. After that foreign newspaper men are allowed, on applying at the offices of the Show, to acquire with difficulty press cards which entitle them to free admission. And there the courtesies to the press end. Nothing is done to influence them in favour of the French Aircraft Industry. So the foreigner can say what he likes with a clear conscience. And as the French Trade buy no British aeroplanes or engines, and do everything they can to prevent us from selling aeroplanes even to private individuals in France there is no chance of criticism upsetting British business.

Nobody can be more charming, or a more loyal friend, than can the better class of Frenchman, especially the Northern Frenchman. And I am fortunate in having some very good friends in France. But the average French commercial man is, to put it mildly, difficult, so we lose little by doing practically no business with France,—at any rate in the aircraft trade.

### THE CHARM OF IGNORANCE.

That being that, we can say frankly that the British Aircraft Industry has nothing to fear and little, if anything,—to learn from the French Aircraft Industry. The outstanding feature of the Paris Show is the craze for monoplanes. A first glance round the exhibits leaves the impression that all the French designers seem to have been bitten by the Herr Doktor Ingenieur Junkers or by Mijnheer Anthony Fokker, and infected with a desire to build low-wing or high-wing monoplanes with one or two or three motors.

Those which are not definitely of Junkers or Fokker shape are high-wing monoplanes with rather thick wings raised above the fuselage so that they look rather like early Westland Widgeons. And the S.E.C.M., a rather promising two-engined monoplane bomber, which most foreign visitors acclaim as the most interesting thing in the show, has a long fuselage built up high and reminds the knowledgeable visitor of the Ursinus bomber, designed and built by Herr Oscar Ursinus (of *Flugsport*) during the War 1914-18,—or of the Handley Page bomber, recently built, which made a brief public appearance a few months ago and then retired modestly to the shelter of the Secret List again.

### THE BEST FRENCH EXHIBIT.

The one real novelty of the Show—a novelty which may prove to be a distinct step forward in the principles of construction—is the Bréguet 270. Even that is only a novelty in being shown to the public for the first time, for it has been flying for many months and was actually designed a year or more ago. The idea of making a huge metal cross (as described later on in its proper place in the report of the Show) and hanging the whole aeroplane onto it is daring and original.

Something like it has been done in England by the Monospar firm, who have lately had a little machine flying with a monospar fuselage as well as a monospar wing. But whereas their single spars depend, in the present form, on wires for their rigidity, the Bréguet single spars are built of corrugated metal and there is not one single wire in the whole aeroplane.

This ought to please those trained engineers who hate the sight of wires because they are not proper structural members. And personally one is inclined to agree with them. A structure braced with wires may be very light, but there is no getting away from the fact that although wires have theoretically a higher factor of safety than any other part of the aeroplane there are more wires than anything else broken in the average aeroplane under ordinary conditions of use.

Whether in Service machines or in civilian machines broken flying-wires or broken landing-wires or broken bracing-wires are quite common. And, although the flying-

**A GENERAL VIEW.—The big Fokker in the foreground.**

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### *Singapore—Calcutta—Singapore*

During 1929 four long-distance flights were undertaken during the S.W. monsoon by No. 205 Squadron R.A.F. with Supermarine Napier flying boats with the object of trying out the weather possibilities for flying and the possibilities of maintaining a prearranged time table in adverse conditions.

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wires and landing-wires are generally duplicated, and although the failure of a single bracing-wire in the fuselage or tail may not cause the whole machine to fall to pieces, a broken wire lashing about loose in a slip-stream and threatening to cut through fabric or to break other wires is not a pleasing thing to have about the aeronautical house.

### THE TIN LIZARD CRAZE.

Mention of fabric leads to another craze which seems to be threatening the French Trade,—that is a consuming desire to sheath wings and fuselages in metal,—generally an alloy of aluminium. That also seems to be a symptom of Junkers-disease.

Possibly the time may come when we shall have wings made entirely of metal,—a kind of lobster's claw, in which the whole strength will be in the shell, without anything inside it in the way of a skeleton. Thus room would be left for engines and goods and passengers, in a way to gladden the heart of Doktor Junkers,—though why anybody should want to sit in a wing when a nice comfortable saloon fuselage with windows on each side is bound to be so much more pleasant I cannot imagine.

To make an ordinary skeleton of spars and ribs and bracing-tubes or wires, and cover it with sheet metal seems merely silly. Fabric is much cheaper and lighter and less liable to damage and easier to repair and simpler to remove for inspection and overhaul. And wonderful things can be done in the way of preserving fabric and making it fire-proof and weather-proof with modern dopes and pigments and varnishes.

Superior engineers have said that covering a metal, or even a wooden, structure with linen or cotton fabric and painting it over with cellulose stuff is not regular engineering. Perhaps not. But if not, will some superior engineer explain why other superior engineers build a structure of steel and put an engine in it which gives out scores or hundreds of horse-power, and build a young house on top of it, and then hurtle it along the road at fifty or sixty miles an hour on wheels which are wrapped round with a mixture of cotton fabric and rubber?

If fabric and rubber will stand up to tens of thousands of miles on the road under some of the finest products of some of the World's best engineers (let us say Rolls-Royce and Lorraine-Dietrich, as they make cars also) then what is the matter with fabric and cellulose supporting the products of the same engineers in the air?

In his new machine M. Bréguet has given up that complicated and expensive covering of aluminium foil with which the fuselage of the Bréguet XIX was covered and has built up a queer dumpy body covered with sheet metal on top of the main limb of his metal cross and has stuck his tail-unit on the end, leaving a length of girder lying naked between the two.

### STREAMLINING GONE WRONG.

Here he seems to have gone wrong. To bring the air in behind the body and then split it again with the edge of the fin seems wasteful. The reason seems to be to give a clear field of fire *under* the tail. But, as a matter of fact, if the streamlining of the body had been carried back on a very narrow frame to the fin, it would have made a much better fusiform shape and would not have interfered with the field of fire any more than the single girder does at present.

And the way the fin and tail and rudder are cocked up at present look as if they are simply asking an excited gunner to shoot them off if an enemy attacks above the level of the tail-plane instead of under it. Just because in the past experienced fighting-pilots attacked *under* the tail, because it was the blind spot where the rear gunner could not see them, we are asked to assume that they will do so for ever to come.

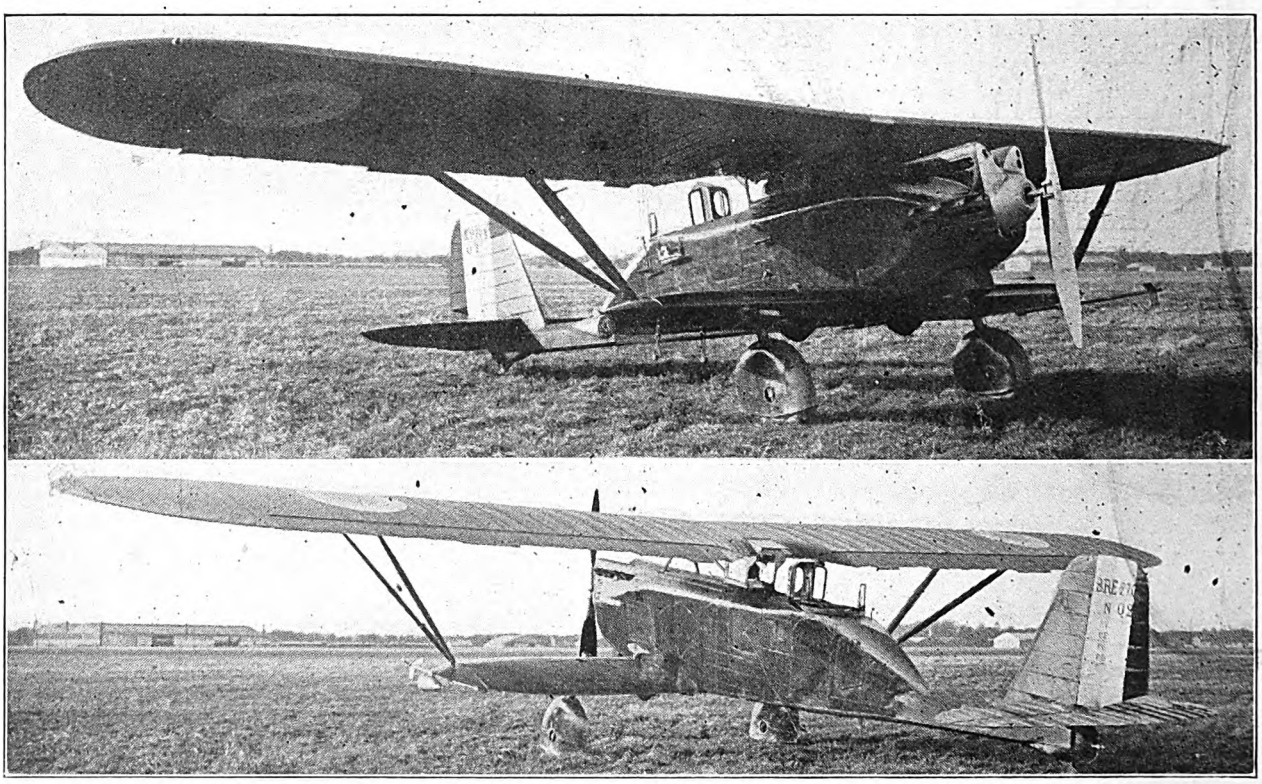
Actually, the best design from that point of view was the old Brandenburg, in which the tail-plane was set level with the fuselage, with the rudder below it, so that the gunner could sweep all round over the top of the tail without shooting-off his rudder. There may have been some aerodynamic disadvantage about a rudder below the level of the tail (Mr. Fairey tried it on one of his types, and gave it up), but from the gunner's view it is excellent, and it ought to work on the new Bréguet much better than the present arrangement.

I hear that M. Bréguet is building a twin-engined commercial machine on this same cross-girder system. It offers great possibilities. It might even be the simplest way of building a twin-engined pusher machine. But, in any case, whatever M. Bréguet does with it is worth watching, because it is the one real novelty in aeroplane construction since all-metal construction settled down into orthodox channels some ten years ago.

### A LOST OPPORTUNITY.

The great pity is that the British Aircraft Industry did not co-operate in putting up a show in the Grand Palais. It would have shaken to the core all visitors from countries outside France. Fortunately those Army, Navy, Air Force and Civil Aviation authorities who did not come to the Paris Show have been well taken care of by our Special British Aircraft Industry Issue last week. No report which they can read of the French exhibits can impress them as much as what they have already read in that issue about our machines which we did not exhibit. But I did wish we had had a Hornet and a Firefly and a few more of our best machines on a good stand on the floor of the hall to keep company with the Bulldog and the Atlas and the Puss-Moth.

The British exhibits made a good show, but they were scattered all over the place and lost much of the effect



**THE CLOU OF THE SHOW.—The Bréguet 270, the cleverest and most original design produced by the French Aircraft Industry for many years. It is described in detail in its proper alphabetical place in the report of the Show.**

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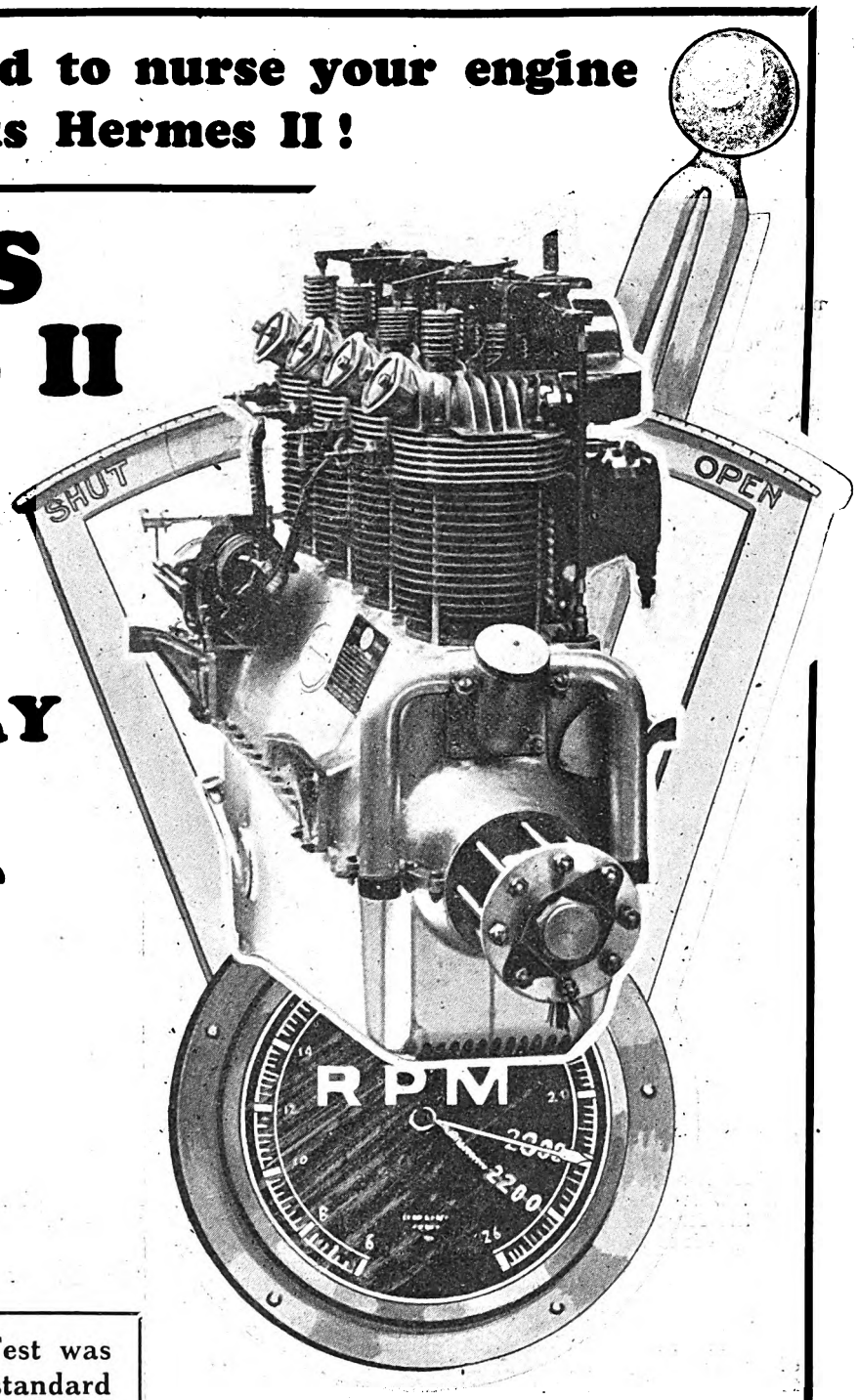


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which they would have had if they had been massed as they were at Gothenburg or in Berlin.—We ought to remember the old tag: "United we stand, divided we fall," and its converse: *Divide et impera.* By our division of our own exhibits the French did not exactly rule over us. But we should have done better with a mass attack on the visitors to the show.

THE BRITISH EXHIBITS.

The Armstrong-Whitworth Atlas and the Bristol Bulldog, the only British machines on stands of their own, were stowed away each in a corner under the gallery, where more than half the visitors never passed them at all. But at any rate they were seen by the serious visitors, who were really looking for knowledge. Naturally, their exquisite workmanship was greatly admired by those who wanted to inspect all-metal structures.

By-the-way,—our old friend the Bristol Sergeant-Commissionaire was there as usual, celebrating about his tenth Paris Aero-Show,—as I seem to remember him there before the War. He wears eight medals (including both South African medals with a lot of clasps, and the three 1914-18 medals) and has a wonderful effect on French official people. But there is a sad story that at the last show an Englishwoman went up to him as he stood proudly alongside the Bulldog and said,—"Did that aeroplane really win all those medals in flying races?"—Sad to say, the Sergeant's answer is not known.

Vickers Ltd. have a very effectively-arranged stand with lighted transparencies showing their machines, and models of the whole range of types, and kinemas showing them in action, and Messrs. Jullerot, Victor Paine and Ratcliffe to explain everything verbally. But they also are in the sort of half-way gallery, and miss the effect that might have been got on ground-floor stand,—especially if it had had the intercepter monoplane on it. I was told (not by Vickers themselves) that they intended to show some new guns, and bomb-sights and other armament, and were to have flown them over in a Vellore freight-carrier. The French Trade promptly put into action the law which prohibits the flying over France of any foreign aeroplane carrying guns. These guns were in boxes, but that did not matter. The law was good enough to keep out foreign competition.

Armstrong-Siddeley Motors are stuffed into a corner under a staircase on the ground floor, but manage to make a brave show by dint of the sheer excellence of their products.

The Bristol Jupiters have a fairly good position on the ground floor, at the corner of the steps leading to the half-way gallery, but their space is cramped. They make up for that by the interest which is caused by their cut-out geared Jupiter, in which everything from the pistons to the gear-wheels is shown in section—and working.

The Rolls-Royce engines are likewise cramped into a corner beside a stairway, by a huge stand which the Show Authorities have allowed the Renault firm to fill with engines for motor-boats and electric-light plants, and so forth, which have nothing directly to do with Aviation. But the fame of the Rolls-Royce F engine, and the specimen which is shown with all parts in section, bring everybody who matters to the stand.

Up in the top gallery Boulton and Paul make a fine show with their metal construction, and a Jupiter engine with a Townend Ring made so that it acts as an exhaust-collector, and a model with a blower which shows how the slip-stream of an airscrew gives the Townend Ring a tendency to pull forward. The whole stand is a credit to Mr. W. H. Sayers, who was responsible for its design and installation. He had the usual terrible time with French transport and French stand-contractors, who were days behind time and hopelessly inefficient, as is their custom. But he got the stand ready for the opening. Major Jack Stewart is in charge, very pleased to see his many friends from all Continental countries, and they are equally pleased to see him.

The Palmer Tyre stand, in charge of Mr. Selit-Renny, the firm's Continental representative, is also drawing visitors from all countries. The Palmer pneumatic, or hydraulic, brake seems to have caught on all over Europe, because of its light weight and simplicity. And, as Mr. Renny knows every country intimately, naturally no chances are lost either way.

The only other British stand is that of Arens Controls, with Mr. Faulkner in charge. He managed to get hold of an un-annexed patch of floor at the foot of a pillar at the last moment, and has made quite a presentable display of this interesting remote-control system.

Although there are so few British exhibitors we have at any rate the satisfaction that the British stands were ready before any others, despite the happy-go-lucky methods of the French workmen, who had to be hired to do the odd jobs, and despite the semi-official people who had to fit electric light and power circuits. One Frenchman who, by long residence in England, had become accustomed to the steady-going if not brilliant English workman, re-


# Three Weeks To Christmas

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| **The Fourth Seal** By Samuel Hoare - | | 15 | 6 |
| **Scarlet & Khaki** By T. B. Marson - | | 10 | 9 |
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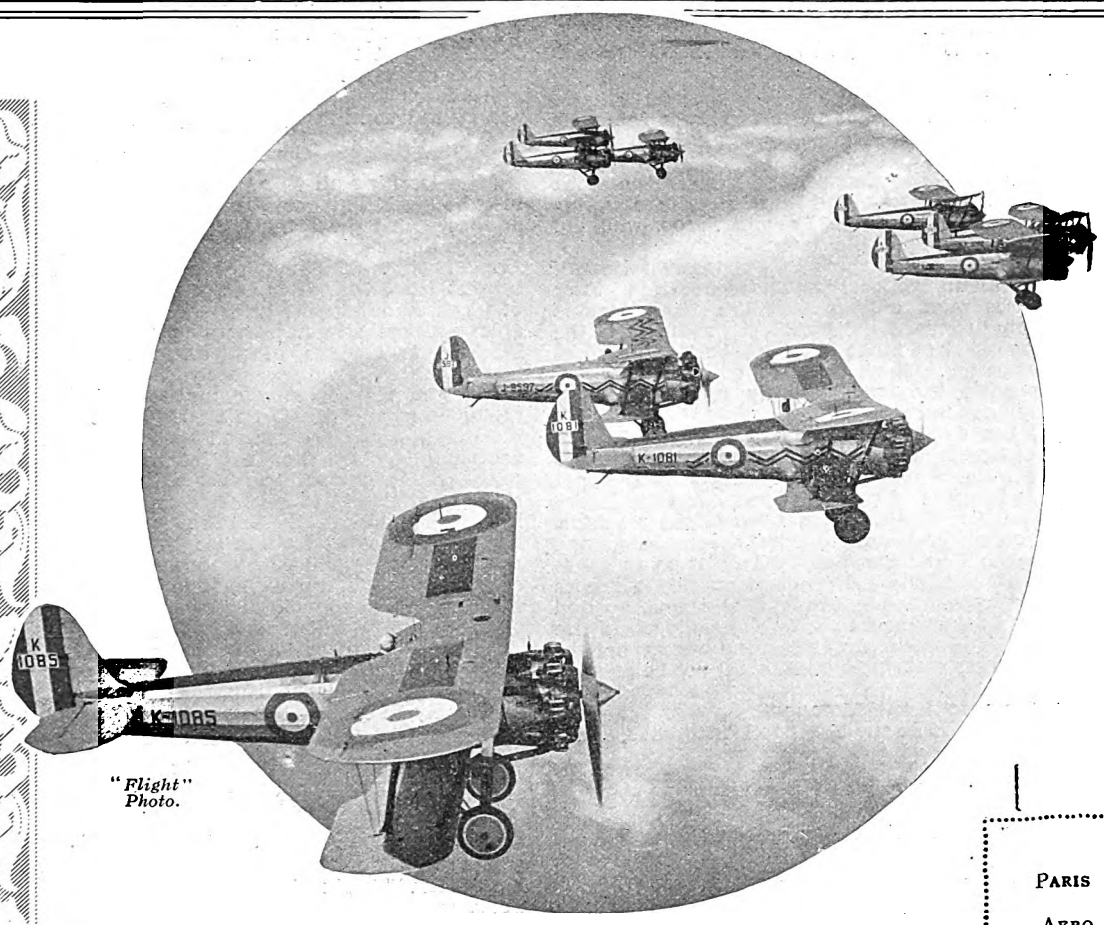


"Flight" Photo.

PARIS AERO EXHIBITION, STAND No. 1, GALLERY K.

The "Bristol"

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marked that the real reason why there is so little unemployment in France is that two Frenchmen are needed to do one normal man's work. Which may be bitter, but has elements of truth in it.

FRENCH OBSTRUCTION.

Naturally, an immense amount of interest was taken by visitors of all nations in the De Havilland Puss-Moth, which was shown on the stand of Morane-Saulnier, who hold the French licence for the manufacture and sale of the Moth in France and her Colonies. And equally naturally this interest raised the wrath of the French Trade, who did everything they could to spoil the party.

The Morane people being the Moth concessionaires, of course the De Havilland firm could not have a stand of their own. But, because Morane is making the Moth biplane and has not started to make the Puss-Moth monoplane, the Show Authorities tried to make out that he had no right to show the machine. They did not quite go to the extreme of removing the Puss-Moth by brute force, but they came fairly near to doing so.

They forbade the display of a placard giving in French the performance-figures and other information about the machine. They insisted on having a young tree in a pot stuck up against the side of the fuselage so as to hide the G which indicated the British registration of the machine.

A famous French sportsman bought the machine and went to the French Department of Civil Aviation to get it registered and to claim the Government subsidy which is granted to all private owners. He was told that he had better un-buy it as quickly as he could, because it would not be registered under French markings, and would not be given an airworthiness certificate, and would not be granted the subsidy.

And, lastly, I am told, the Morane firm were informed that if they started to make the Puss-Moth in France, somebody or other would take mighty good care that the designs would not be passed as airworthy for a safe twelve months. The idea here naturally is to give the obviously unoriginal French makers of light aeroplanes a chance to copy Puss-Moth ideas and to catch up the year or two which they are behind us in aeroplane design of all sorts.

COTY VERSUS EYNAC.

After learning all this I am beginning to think that there may be something more than personal spite in the furious attacks which that amusing paper *L'Ami du Peuple,* which belongs to the good M. Coty, has been making on the French Air Ministry. If I may be allowed a mild vulgarism, I suggest that, though M. Coty produces the most amiable of physical odours, he certainly kicks up the most abominable political stinks. According to him, the French Air Ministry is capable of anything, from pitch-and-toss to manslaughter, with apparently a slight bias in favour of the latter, if people may judge by the harvest of fatal accidents in the *Armée de l'Air.* If the fault is not in the machines, which are ordered by favour and not by merit, according to Coty, then the fault is in the training of the pilots, which is also the fault of the Air Ministry. And as the Air Ministry is the fault—or the virtue, according to how you look at it,—of the good Sir Laurent Eynac, K.C.M.G., Minister for Air (to give him his English title in full), the whole thing boils down to a row between Coty and M. Eynac, and is rather like the attacks by the Rothermere and Beaverbrook papers on our Mr. Baldwin, except that it is funny without being vulgar.

Nevertheless, after *l'affaire Puss-Moth,* I am beginning to think that M. Eynac might just take a look-see at what is happening in his sub-departments, on which he cannot reasonably be expected to keep his eye all the time.

*(To be continued.)*

# THE AEROPLANES IN THE PARIS SHOW.

**A.N.F. (les Ateliers de Constructions du Nord de la France et des Mureaux). Stand 39.**

This company, which was previously known as the Ateliers de Mureaux, is showing a two-seat reconnaissance monoplane known as the type 111.R2.

It is a very ordinary high-wing braced monoplane of all-metal construction and fitted with the 650 h.p. Hispano-Suiza engine.

The wing is carried above the fuselage on a steel tube cabane and is braced on either side to the bottom of the fuselage by parallel struts. The leading edge is easily removable to enable a rapid inspection of the interior of the wing to be made.

The undercarriage is of the divided type with the main compression legs attached to the front wing-bracing-struts. Wheel brakes are fitted.

The machine is built mainly of open duralumin profiles rivetted together and is covered with sheet duralumin. The fuselage covering is reinforced with external longitudinal stiffeners, two on the sides and three on the domed bottom. The pilot is aft of the wing with the observer's cockpit immediately behind.

The engine is completely cowled in and the radiator is mounted below the engine in a species of semi-tunnel.

Compared with the previous Mureaux reconnaissance monoplane which was exhibited at the last Salon, the 111.R2 is an advance in cleanliness of design, but there is nothing remarkable about it.

**ARMSTRONG WHITWORTH (Sir W. G. Armstrong Whitworth Aircraft Ltd.). Galley A, Stand 1.**

A complete Atlas Army Co-operation two-seater is shown, and various components of its construction in skeleton. The Armstrong Siddeley Panther (Jaguar-Major) engine is also shown in a very attractive set-up, some construction panels and the model of an Argosy standing on the prostrate specimen of an actual wheel as used thereon.

One of the most interesting exhibits on this stand is the spar-deflection test as shown at Olympia in 1929. A 15 ft. spar, as used in the lower wing of an Atlas, is set up so that a 500-lb. weight hangs at the exact middle. The total deflection is six inches, and in spite of the many hundreds of times which this demonstration has bent the spar the latter still fails to show any permanent deflection.

The lower wing and front half of the fuselage of an Atlas shows the methods used, and a large panel of progress construction shows the way the metal is treated. The skeleton of an aileron is also exhibited, and details of the slots, oleo-leg and stern-post occupy another panel lay-out.

The Atlas itself is well known, and the specimen shown has been given a very attractive exhibition finish. It is shown with a Jaguar engine, and the alternative Jaguar Major, or Panther, occupies a stand near by resplendent in aluminium paint and nickel fittings.

**B.F.W. (Bayerische Flugzeugwerke A.G.). Stand 13.**

The exhibit of this firm is the same B.F.W. M23c which Herr Fritz Morzik flew to victory in the *Challenge de Tourisme International* of 1930. It has the same inverted Argus As.8 engine and carries its racing number, B3, *en cartouche.*

**BERNARD (Société des Avions). Stand 37**

The Bernard Company shows three aeroplanes, the type 191G.R. "*Oiseau Canari,*" with which MM. Assolant, Lefevre, Lotti, and the stowaway Schreiber flew across the Atlantic on June 13, 1929; the S.73 single-seat monoplane; and the H.V.42 racing seaplane.

The *Oiseau Canari,* of comparatively antique design, only requires mentioning historically as the first French aeroplane to fly the Atlantic.

The S.73 is a very neat, but at the same time very blind, middle-wing cantilever monoplane, with the 300 h.p. Gnôme-Rhône Titan-Major radial engine. The fuselage is a wooden monocoque with fin built integrally with it. The wing is presumably of wooden construction and has plywood covering, but the ailerons are covered with corrugated metal and therefore can be presumed to have metal frames.

The under-carriage is of the split type, with the axles hinged at their inner ends to a Vee cabane under the fuselage. Wheel brakes are fitted.

The pilot's cockpit is situated over the trailing edge of the wing and vision forwards and downwards appears to be practically non-existent.

The machine is very clean and considerable attention has been paid to putting all drag-producing excrescences out of harm's way. The only external control levers are those of the rudder, and the rudder cables run for less than a foot outside the fuselage.

The Bernard H.V.42 is a high-speed seaplane which is labelled an *Hydravion le Liaison Rapide,* a happy title for a machine with a top speed of approximately 280 m.p.h. It was produced as a high-speed training type for French aspirants for the Schneider Trophy team. Except for the floats and the engine it is almost identical to the S.73.

The engine is a special 900 h.p. twelve-cylinder Vee Hispano-Suiza and the floats are of the long single-step, streamline, all-metal type. The basis of the machine is a built-up duralumin centre unit to which are attached the engine-mounting in front, and the monocoque fuselage behind, the wings, on each side and the floats below.

The floats are attached to this unit by two "N" type struts, the spaces between the front two legs of which are faired in. Round the tops of these float struts and close up to the fuselage, are located the gilled radiators.

The wings are wire-braced to the floats as in the British type Schneider racers, but there is no bracing from the top of the wings to the fuselage. The oil radiators are

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## COMPARATIVE SPECIFICATIONS OF THE AEROPLANES AT THE PARIS SHOW.

| MACHINE | ENGINE. | No. of Seats (M—military C—commercial) | Span m. | Length m. | Height m. | Wing Area sq. m. | Wt. empty kgs. | Wt. loaded kgs. | Max Speed km./hr. | Cruising speed km./hr. | Landing speed km./hr. | Ceiling m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Armstrong Whitworth Atlas ... | 450 h.p. Jaguar (direct)... ... | 2.M | 12.03 | 8.45 | 3.44 | 36.5 | — | 1820 | 231 | — | — | 5280 |
| B.F.W. M.23c. ... ... ... | 100 h.p. Argus As.8 ... ... | 2.C | 12 | 7.4 | 2.2 | — | 322 | 600 | 175 | 148 | 70 | 5500 |
| Bernard 73 ... ... ... | 300 h.p. Titan-Major ... ... | 1.M | — | — | — | — | — | — | — | — | — | — |
| Bernard H.V. 42 ... ... ... | 900 h.p. Hispano-Suiza ... | 1.R | — | — | — | — | — | — | 450 | — | — | — |
| Bleriot 111 ... ... ... | 400 h.p. Hispano-Suiza ... | 5.C | 17 | 10.64 | 4.03 | — | 1600 | 2700 | — | 200 | — | — |
| Bleriot 125 ... ... ... | 2×500 h.p. Hispano-Suiza ... | 14.C | 20.4 | 13.8 | 4 | 100 | 3930 | 6300 | 205 | — | — | — |
| Breguet 230 ... ... ... | 600 h.p. Hispano-Suiza ... | 3.M | 17.48 | 11.33 | — | 55.79 | — | 3600 | 240 at 2000m | — | — | 6500 |
| Breguet 270 ... ... ... | 500 h.p. Hispan -Suiza... ... | 2.M | 17 | 9.8 | — | 49.32 | 1580 | 2260 | 240 | — | — | 8000 |
| Bristol Bulldog ... ... ... | 450 h.p. Jupiter ... ... ... | 1.M | 10.31 | 7.56 | — | 28.5 | 903 | 1475 | 280 | — | — | 8900 |
| C.A.M.S. 80 ... ... ... | 700 h.p. Lorraine ... ... | 3.M | 24.6 | 13 | 5.1 | — | 2625 | 3975 | 210 | — | — | 6500 |
| Caudron 193 ... ... ... | 95 h.p. Renault ... ... ... | 2.C | 11.5 | 7.48 | 3.17 | 13.85 | — | 760 | 170 | 145 | — | — |
| Caudron 180 ... ... ... | 3 × 300 h.p. Lorraine ... ... | 12.C | 24.5 | 14.6 | 3.7 | 70 | 2690 | 4700 | 225 | — | — | 7000 |
| Caudron 232 ... ... ... | 95 h.p. Renault ... ... ... | 2.C | 9.9 | 7.45 | 2.72 | 24 | — | 780 | 150 | 130 | 68 | — |
| Couzinet 29.T1 ... ... ... | 3 × 40 h.p. Salmson ... ... | 5.C | — | — | — | — | — | — | — | — | — | — |
| D. H. Puss Moth ... ... ... | 120 h.p. Gipsy III ... ... | 3.C | 11.20 | 7.62 | 2.08 | | 536-550 | 930 | 203 | 161-186 | 67.6 | 5334 |
| Dewoitine D.27 ... ... ... | 500 h.p. Hispano-Suiza . | 1.M | 10.3 | 6.5 | 2.9 | 17.5 | 970 | 1330 | 290 | — | — | 9250 |
| Dewoitine D.30 ... ... ... | 600 h.p. Hispano-Suiza .. | 12.C | — | — | — | — | — | — | — | — | — | — |
| Dewoitine D.35 ... ... ... | 300 h.p. Whirlwind ... . | 5.C | 12.16 | 9.18 | 3 | 24.6 | 1080 | 1860 | — | — | — | — |
| Dornier Do.S ... ... ... | 4 × 600 h.p. Hispano-Suiza ... | 27.C | 31 | 25.75 | 8.15 | 175 | — | — | — | — | — | — |
| Farman 190 ... ... ... | 240 h.p. Lorraine ... ... | 5.C | 14.1 | 10 | 3 | 40 | 1030 | 1800 | 200 | 170 | 80 | 5500 |
| Farman 200 ... ... ... | 100 h.p. Hispano Suiza ... | 2.C | 11 | — | 2.6 | 25 | — | — | 170 | — | — | — |
| Farman 231 ... ... ... | 95 h.p. Renault ... ... ... | 2.C | 9.1 | 6.15 | 2 | 14.5 | 380 | 650 | 190 | 160 | 70 | — |
| Farma 301 ... ... ... | 3 × 230 h.p. Salmson ... ... | 10.C | 19 | 13.35 | 3.2 | 66 | 2730 | 4530 | 225 | — | — | — |
| Fiat A.S.2 ... ... ... | 85 h.p. Fiat ... ... ... | 2.C | — | — | — | — | 460 | 740 | 175 | — | 70 | — |
| Fiat T.R.1 ... ... ... | 95 h.p. Fiat ... ... ... | 2.C | — | — | — | — | 450 | 730 | 190 | — | 70 | — |
| Fokke. F.XI ... ... ... | 3 × 450 h.p. Jupiter ... ... | 20.C | 27.14 | 19.3 | 4.8 | 103 | 5450 | 9000 | 210 | 173 | 108 | 3600 |
| Fokker C.VIII.W. ... ... | 500 h.p. Lorraine ... ... | 3.M | 18 | 11.5 | 3.8 | 44 | 1915 | 2750 | 201 | 160 | — | 4650 |
| Guillemin (Blériot) ... ... | 120 h.p. Salmson ... ... | 2.C | — | — | — | — | — | — | — | — | — | — |
| Junkers Junior ... ... ... | 80,88 h.p. Genet... ... ... | 2.C | 10 | 7.12 | 2.4 | 13.8 | 350 | 600 | 175 | 140 | 74 | 3800 |
| Latécoère 28 ... ... ... | 600 h.p. Hispano-Suiza ... | 2.C | 19.25 | 13.645 | — | — | — | — | 240 | — | — | 4000 |
| Latécoère 350 ... ... ... | 3×400 h.p. Hispano-Suiza ... | 10.C | — | — | — | — | — | — | — | — | — | — |
| Levasseur P.L.XI ... ... | 450 h.p. Jupiter ... ... ... | 3.M | 14.2 | 10.05 | 4.5 | 57.5 | 1900 | 2800 | 170 | — | — | 3500 |
| Levasseur P.L.XII .. ... | 230 h.p. Salmson ... ... | 2.M | 13 | 8.94 | 3.34 | 31.03 | 1023 | 1600 | 170 | — | — | 5400 |
| Le O.H.22 ... ... ... | 230 h.p. Titan ... ... ... | 4.C | 15.94 | 10.7 | 3 | 33 | 1340 | 1800 | 170 | — | — | 4000 |
| Le O.203 ... ... ... | 4×300 h.p. Titan Major ... | 4.M | 22.3 | 13.8 | — | — | 4004 | 6600 | 195 | — | — | — |
| Lorraine-Hanriot 10 ... ... | 100 h.p. Lorraine ... ... | 2.M | 11.9 | 7.43 | 2.9 | 22 | 592 | 850 | 147 | — | — | 4500 |
| Lorraine-Hanriot 21 ... ... | 120 h.p. Lorraine ... ... | 2.M | 12.2 | 7.8 | 2.93 | 26 | 780 | 980 | 155 | — | 60 | 4800 |
| Lorraine-Hanriot 431 ... ... | 240 h.p. Lorraine ... ... | 2.M | 11.4 | 8.12 | 3.3 | 30 | 936 | 1370 | 184 | — | 85 | 5000 |
| Morane-Saulnier Moth ... ... | 100 h.p. Gipsy I ... ... ... | 2.C | 9.15 | 7.3 | — | — | 408 | 613 | 170 | 140 | 67 | 5500 |
| Morane-Saulnier 224 ... ... | 450 h.p. Jupiter ... ... ... | 1.M | 9.8 | 6.5 | 1.98 | 16 | — | 1250 | — | — | — | — |
| Morane-Saulnier 230 ... ... | 230 h.p. Salmson ... ... | 2.C | 10.7 | 6.9 | 2.73 | 19 | — | 1149 | 205 | — | — | — |
| Morane-Saulnier 301 ... ... | 120 h.p. Lorraine .. ... | 2.M | 12 | 7.5 | 2.63 | 21 | — | 933 | — | — | — | — |
| Mureaux 111.R.2 ... ... ... | 600 h.p. Hispano-Suiza ... | 2.M | 15.4 | 10 | 3.63 | 35 | 1440 | 2250 | 272 | — | 97 | 7900 |
| Nieuport-Delage 82.C.1 ... ... | 500 h.p. Lorraine ... ... | 1.M | 12 | 7.5 | 3 | 28 | 1200 | 1600 | 271 | — | 108 | 9450 |
| Nieuport-Delage 540 ... ... | 600 h.p. Lorraine ... ... | 12.C | 23.4 | 15 | 3.8 | 60 | 2250 | 3850 | 214 | 196 | 101 | 4660 |
| Nieuport-Delage 641 ... ... | 240 h.p. Lorraine ... ... | 6.C | 15.4 | 9.45 | 3.9 | 31 | 1100 | 1800 | 210 | 170 | 90 | 4800 |
| P.Z.L. 2 ... ... ... | 200 h.p. Skoda ... ... .. | 2.M | — | — | — | — | — | — | — | — | — | — |
| P.Z.L. P.6 ... ... .. | 450 h.p. Jupiter ... ... ... | 1.M | 10.3 | 7.16 | 2.75 | 17.30 | 865 | 1340 | 292 | — | 103 | 9000 |
| Potez 36 ... ... ... | 95 h.p. Renault ... ... ... | 2.C | 10.4 | 7.35 | 2.47 | 20 | 426 | 720 | 160 | — | — | 4100 |
| Potez 39 ... ... ... | 500 h.p. Hispano-Suiza ... | 2.M | 16 | 10 | 3.4 | 35 | — | 2250 | 239.5 | — | — | 7700 |
| Potez 40 ... ... ... | 3 × 230 h.p. Salmson ... ... | 10.C | 18.5 | 14.4 | 3.45 | 63 | 2582 | 4270 | 213 | — | — | 5800 |
| Romeo Ro.5 ... ... ... | 85 h.p. Fiat ... ... ... | 2.C | 11.22 | 7.05 | — | 19 | 400 | 680 | 170/180 | 150/155 | 60/65 | 5000 |
| Romeo Ro.5S ... ... ... | 85 h.p. Fiat ... ... ... | 2.C | — | — | — | — | — | — | — | — | — | — |
| S.P.C.A. 40T. ... ... ... | 3 × 120 h.p. Salmson ... ... | 7.C | 20 | 13.18 | 3.25 | 55 | 2274 | 3144 | 180 | — | — | 3700 |
| Schreck-F.B.A. 271 ... ... | 300 h.p. Lorraine ... ... | 4.C | 13.1 | 9.48 | 4.04 | 40.15 | — | 1980 | 170 | — | — | 4100 |
| Schreck-F.B.A. 310 ... ... | 120 h.p. Lorraine ... ... | 2.C | 12 | 7.6 | 3.08 | 21 | — | 900 | 150 | — | — | 4000 |
| S.E.C.M.-Amiot 140.M. ... | 2 × 700 h.p. Lorraine ... ... | 4.M | 24.46 | 17 | 3.5 | 100 | 4200 | 5690 | 242 | — | 85 | 8000 |
| Spad 91 C.1 ... ... ... | 500 h.p. Hispano,Suiza ... | 1.M | 8.65 | 6.3 | 2.72 | 22 | 1132 | 1497 | 270 at 4000m | — | — | 8500 |
| Weymann-Lepère ... ... | Renault ... ... ... ... | 2.C | — | — | — | — | — | — | — | — | — | — |
| Wibault 280 T 10 ... ... ... | 3 × 300 h.p. Titan-Major ... | 12.C | 22.6 | 17 | 4.25 | 64.2 | — | 5310 | 202 | — | — | 5800 |

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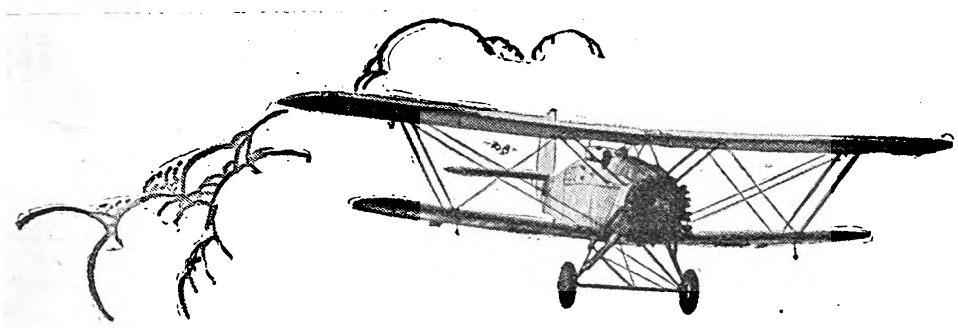

PARIS
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# ARMSTRONG WHITWORTH

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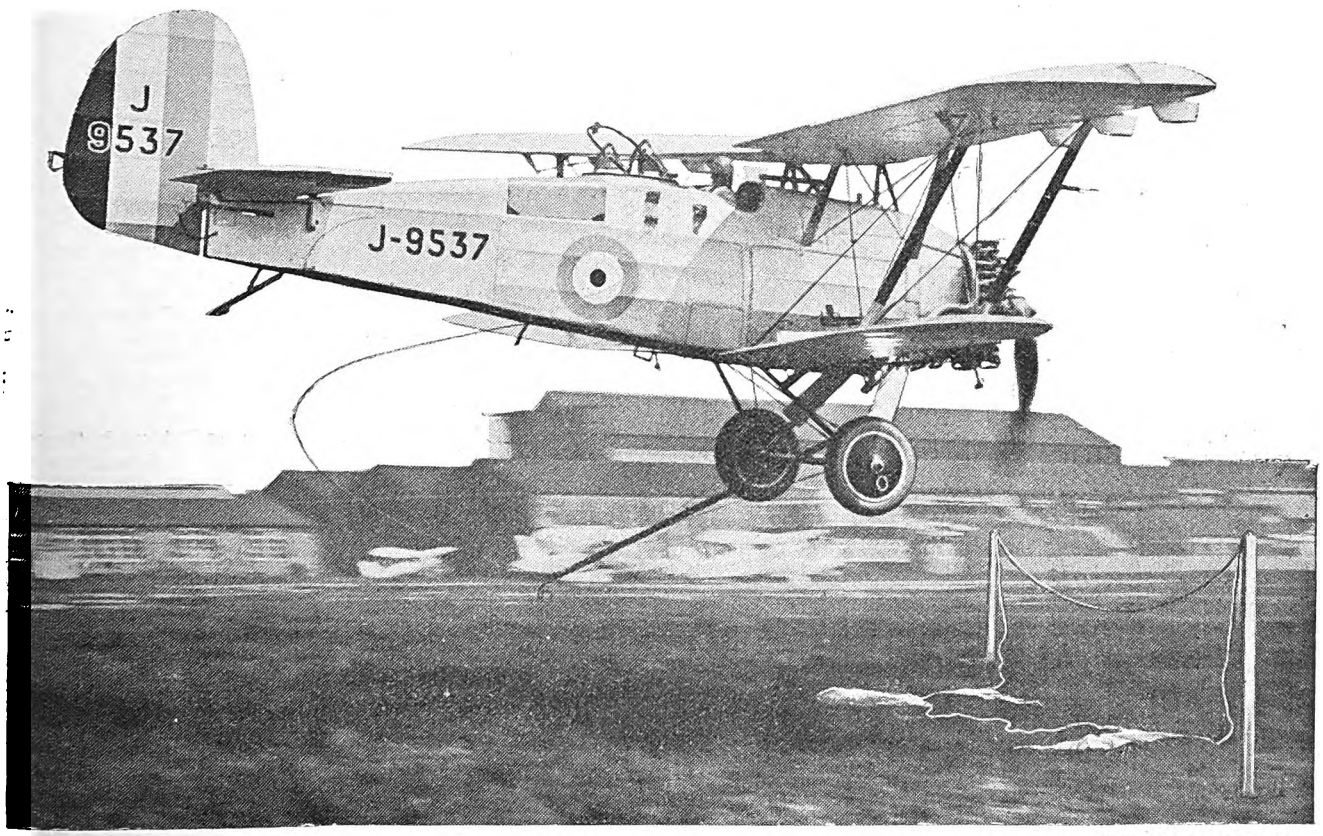


"Flight" Photograph.

The Atlas Picking Up Messages.



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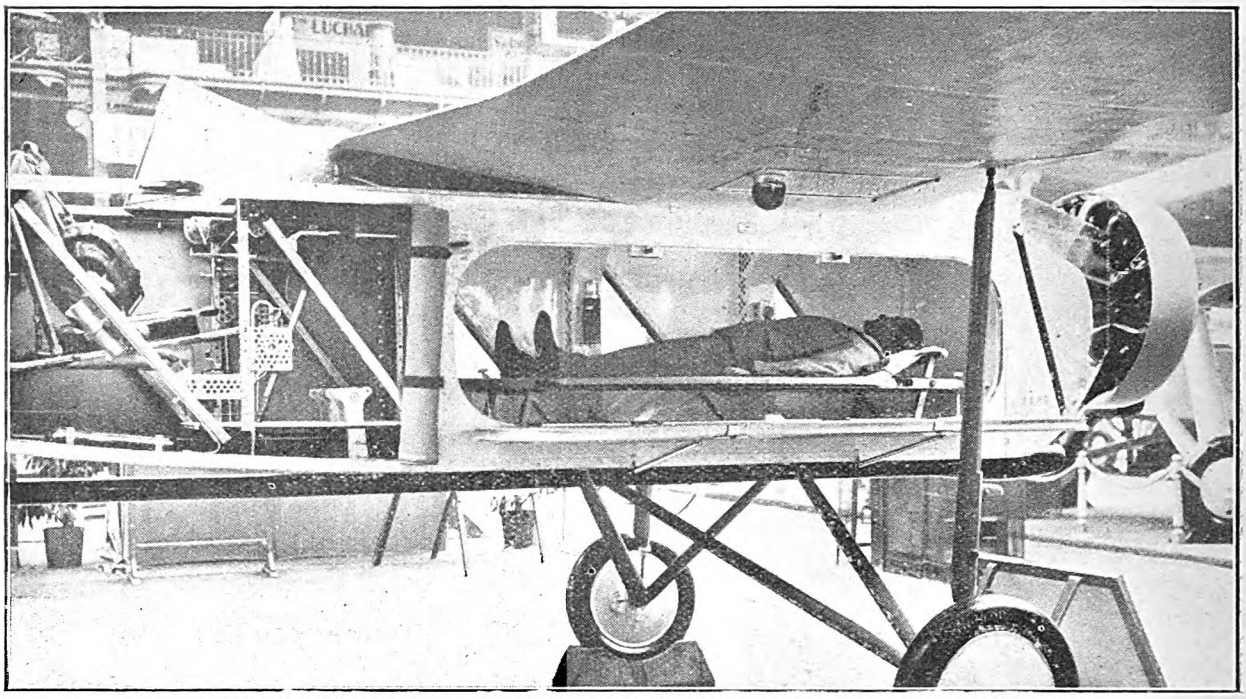
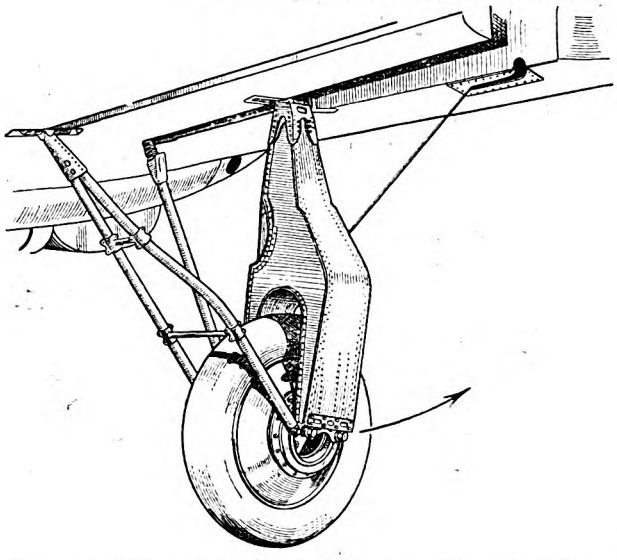
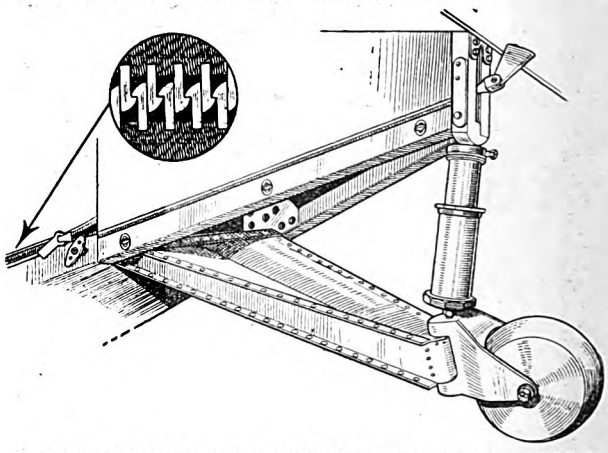


THE HOSPITAL SHIP.—The Blériot "avion sanitaire," designed by M. Guillemin.



The retractable undercarriage of the Blériot monoplane.



The tail-wheel arrangement of the Sanitary Blériot.

built integral with the bottom of the fuselage, and they are braced to the top of the fuselage by parallel struts.

The undercarriage is of the retractable type, described in French as *escamotable*, operated mechanically from the pilot's cockpit. Each unit consists of a built-up duralumin Vee fork in which is mounted a Bleriot internally-sprung wheel. This is braced to the fuselage by an extensible member comprising two tubes which telescope one within the other. The fork and wheel swing outwards, thus extending the bracing tube, and when in the raised position everything is completely hidden in recesses in the underside of the wing. In the down position the undercarriage is locked by a spring catch on the inner member of the telescopic bracing tube which engages a collar on the outer member and is held there by a ramp, also on the outer member, which slides up against a coil spring and is held in position by the continuous cable which operates the whole gear.

The Guillemin *Avion Sanitaire* is a light cantilever monoplane which has accommodation for one stretcher case and one pilot. The fuselage is rectangular and is built up of square duralumin tubes, covered forward and above and below aft with duralumin sheet. The sides aft are covered with a species of American cloth which is attached with "Zip" fasteners to the top and bottom longerons.

The stretcher case is carried in a compartment under the wing and the whole of the right side of this compartment hinges down and is locked in a horizontal position by tubes. The pilot's cockpit is aft of the wing and is very roomy. It is provided with a very large transparent wind-screen and long narrow side-panels between the turned-up trailing-edge of the centre-section and the fuselage. All the instruments are mounted in the same plane on zig-zag projections, or horizontal steps, from the side of the fuselage.

There is a large transparent panel between the cockpit and the stretcher compartment which with the lack of a central dashboard allows the pilot to see whether the occupant of the front compartment is still alive.

The wings are of the cantilever type, of tapering chord and thickness attached to a small centre-section, and are of wooden construction with plywood covering.

The undercarriage is of the divided type, with the main compression legs running up to the extremities of the centre-section.

The engine is a 120 h.p. Salmson radial with Townend ring cowling and exhaust collector-ring. The exhaust is led away through an open-fronted expansion chamber to a point well aft of the accommodation.

The Spad 91.C1 is a single-seat fighter biplane with the 500 h.p. Hispano-Suiza engine. It is a characteristic Spad biplane with back-swept top plane and I-type interplane struts. The construction is of metal with fabric covering. It is a development of several previous fighter biplanes which have been exhibited at previous Paris Shows.

**BREGUET (Société d'Aviation Louis). Stand 1.**

This exhibit includes the old and the new to an unusual degree, and contains what is probably the most interesting material in the whole exhibition.

A very decided centre of popular interest is the famous old *Point d'Interrogation* (or "Question Mark"), the Breguet 19 which flew the Atlantic from East to West and also carried MM. Costes and Bellonte on a *tour d'amitié* in the United States. This machine also holds the World's record for straight-line distance, which it put up in September 1929 from Paris to Tsitsihar. With the points of call of its distinguished flights set forth on its fuselage this machine, credited with its 600 hours and 70,000 miles of flying, is of decided sentimental interest to Parisians. The panels alongside the cockpits are removed to show the controls, instru-

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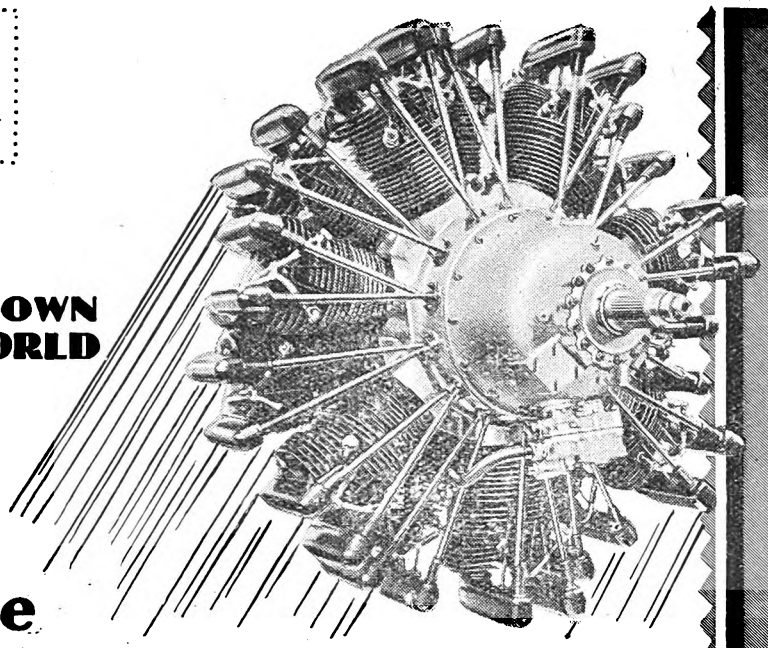
PARIS
AERO SHOW
*Nov. 28—Dec. 14*
STAND 1 GALLERY A



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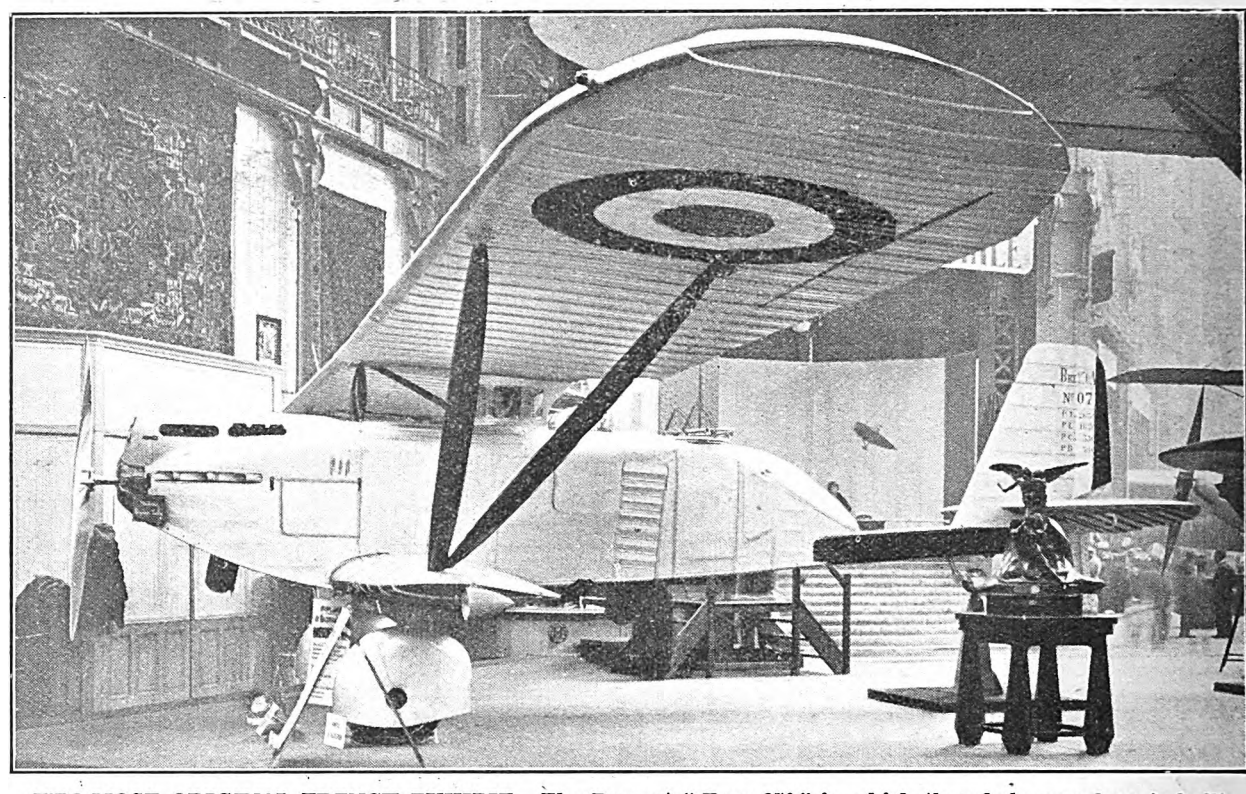
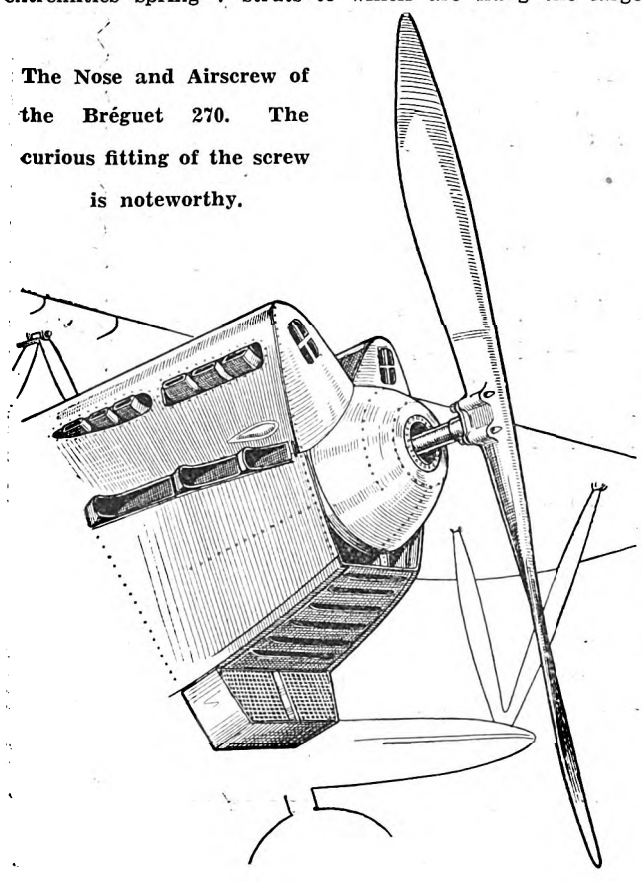


**THE MOST ORIGINAL FRENCH EXHIBIT.—The Breguet " Type 270 " in which the whole aeroplane is built up on a foundation which is a cross made of corrugated steel. The main limb of the cross is seen projecting between the aft gun-pit and the tail-unit. The idea is to give a better field of fire for the gunner.**

ments, etc., and a continuous film recounts the adventures of its venturesome pilots.

The Breguet 270 is the most interesting aeroplane in the Show. It is simply assembled on a cruciform foundation of two heavy steel spars. The fuselage, comprising the engine and two cockpits, is built up on the fore and aft member, and is faired off aft of the rear cockpit some feet before the tail begins, leaving the spar quite naked. At the end of this spar the tail surfaces are mounted in full cantilever fashion.

The cross-member takes all flying and landing loads. It forms the main spar of the short lower wings, and from its extremities spring V struts to which are hung the large upper wings. These are joined on the median line and have no cantilever quality. There is no inter-wing bracing whatever. Beneath the lower wing and midway between the fuselage and the tips are mounted the landing wheels. They are carried in individual and quite unbraced forks which telescope into the wing against suitable shock-absorbing mechanism. They are fitted with Breguet brakes.



**The Nose and Airscrew of the Bréguet 270. The curious fitting of the screw is noteworthy.**

The model shown has seats for a pilot and gunner. The rear cockpit, besides a gun-ring, has an individual windscreen, and the field of fire is unusually large because of the abrupt end to the nacelle immediately behind. In the absence of a gun-stop the danger of shooting through the mono-spar fuselage and/or the tail surfaces would seem to be rather imminent in tense moments. The whole machine seems very clean and is said to fly exceptionally well.

The detachable motor-mounting is duplicated in an exhibit alongside, and the construction is well shown by a series of steel parts as used in this machine. The model of a larger commercial type built on exactly the same system, the B.41, is also shown.

A new three-place military modification of the B.19, and known as the B.230, is shown in skeleton form. The firm's special method of using standard lengths of tubing for bolting up into the fuselage is easily seen. The machine varies very little from the standard 19 except in having a conservatory for the combined second pilot, wireless operator and bomber. The rear cockpit has a gun-ring. Like the Tout Acier 270 it has a 600 h.p. Hispano-Suiza engine.

**BRISTOL (The Bristol Aeroplane Co. Ltd.).** **Gallery K, Stand 1.**

A Bristol Bulldog single-seat fighter, very well prepared for exhibition, is reinforced by various examples of steel construction and panels showing the process of building.

The well-known Bulldog is supported in flying position with its metal parts either polished or painted with aluminium. A set of steps permits interested visitors to inspect the extraordinary mass of equipment in the cockpit.

A lower wing skeleton is exhibited entire to show the method of steel construction, and a rib is shown undergoing a vibration test as well as a static load demonstration. Large picture-panels are so arranged that they exhibit all stages of the metal construction of ribs as well as characteristic pieces of the Bulldog in the raw, so to speak.

**CAUDRON.** **Stand 15.**

Two light aeroplanes, the C.195 and the C.232, and a 10-seater commercial tri-motor monoplane known as the C.180 are shown.

The C.195 low-wing all-wood monoplane with 95 h.p. Renault engine, which was represented in the *Challenge de Tourisme International,* is exhibited in the same form as flown in the tour and as previously described in THE AERO-

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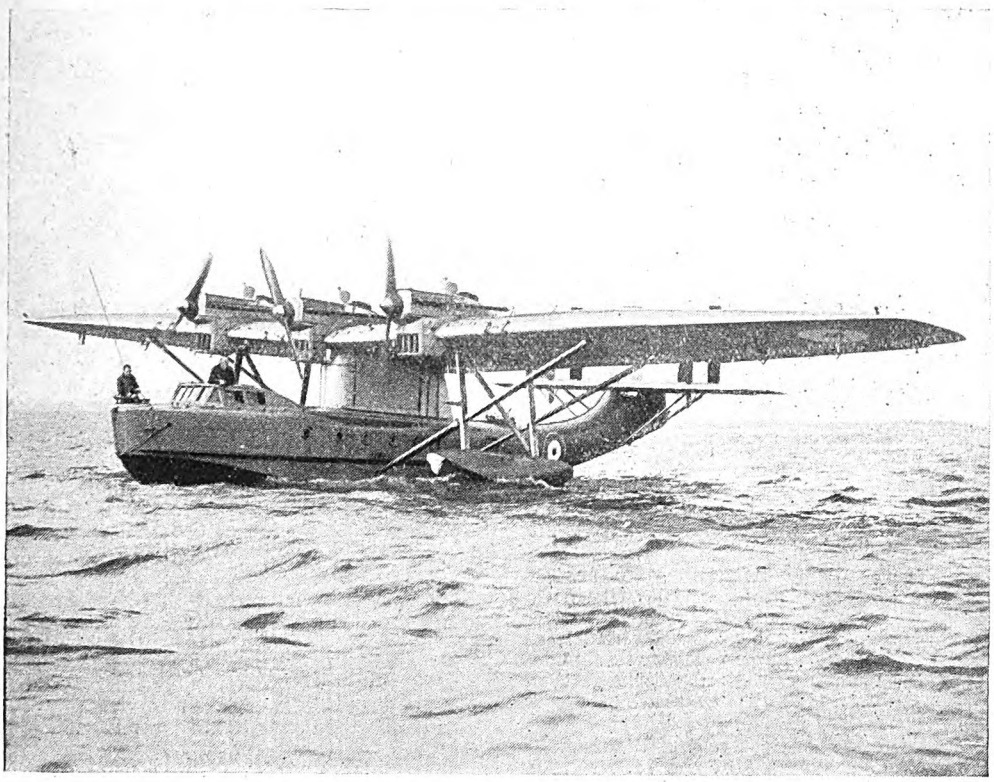
# DOPED WITH



*Blackburn "Sydney." "Flight" Photograph.*

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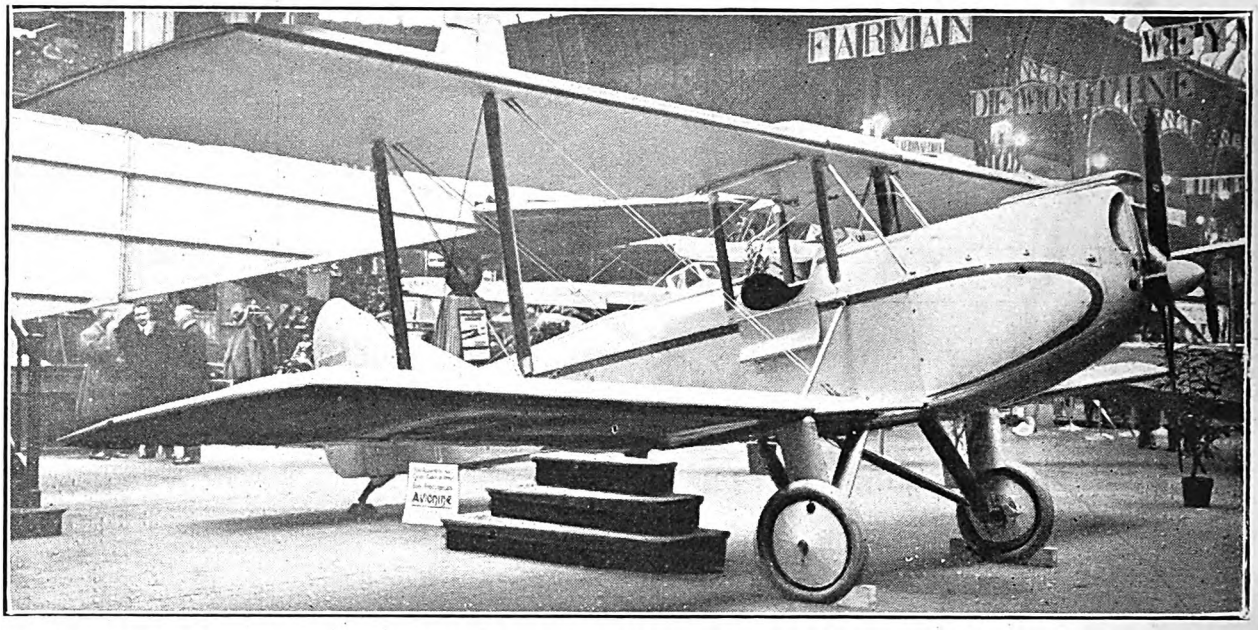



**THE ANSWER IS IN THE AFFIRMATIVE!—The Caudron biplane which a visitor described as "The French answer to the Moth." To which another visitor remarked, "They seem to be merely saying Yes.'"**

PLANE. The fuselage is roomy, the luggage space ample and the construction seems quite sturdy, but the faults which became evident during the *Europarundflug* seem to persist. The bi-convex wing, of sharp taper and small area, presumably continues to give a high landing speed without correspondingly good maximum performance. Taking it all round it is a poor aeroplane.

The C.232 light two-seat biplane has the same engine as the C.195 and otherwise has so many characteristics of the familiar domestic Moth that it might almost be called a copy of it. The span is slightly greater but the chord less, and there is little stagger. The fuselage is larger in section and the cockpits are most comfortably fitted with imitation leather upholstery. The tail is undiluted Caudron of cantilever all-wood type.

Ailerons are fitted on the lower wings only and the scalloped trailing edge is still characteristic of the breed. The centre-section, flap door to the front cockpit, folding wings and jury struts are all taken from the English prototype. Wheels brakes are fitted.

The C.180 commercial model was finished just in time to take its place in the show and bears obvious signs of an unfinished state. It is an all-metal cantilever monoplane with decided Fokker antecedents, and has three 300 h.p. Lorraine radial engines.

The construction is mainly of duralumin sections with rivetted sheet duralumin covering. The fuselage is in two portions joined by bolts, and the wing is built up of a main caisson to which are bolted leading and trailing edges. The centre-section carries the wing engines, and outside the mountings the wing tips are attached.

The wing engines are mounted high and their fairings merge right into the leading edge. The covering of the wings is intermittently corrugated and the fuselage covering is stiffened at wide intervals by ridges.

The landing gear is orthodox, with Messier oleo pneumatic legs ascending to the engine mountings. Brakes are standard equipment. The metal elevator is continuous across the trailing edge of the tail-plane and the rudder is wholly above it. The rear support is a small wheel.

**COUZINET (Avions René).** **Stand 36.**

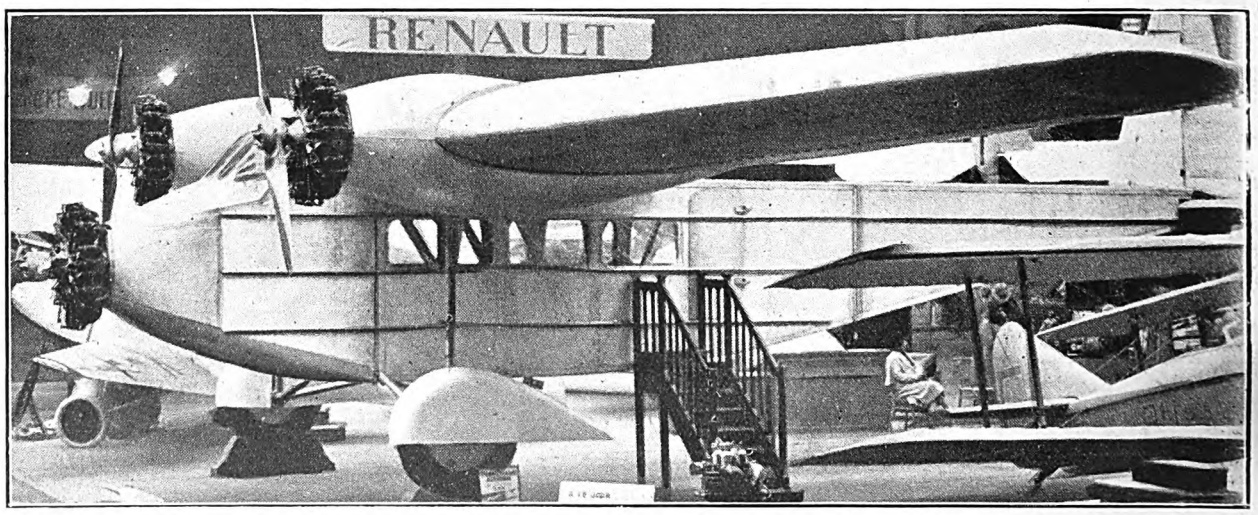
This firm shows a small three-engined five-seat monoplane known as the Couzinet 29.T1. The fuselage starts with a very sharp point, thickens up in the region of the pilot's enclosed cockpit and then maintains its depth to the rudder-port and rudder, but it gradually narrows and sweeps up to a vertical knife-edge aft.

The wing is of the low cantilever type, and built into it on either side of the fuselage are two extremely small and sharply-pointed nacelles for the wing engines, which, like the nose engine, are 40 h.p. Salmson 9-cylinder radials.

The machine is of all-wood construction with plywood covering. The fuselage is a monocoque and the wings are built up on the multi-spar principle.

The undercarriage is retractable, but the actual method of retraction is hidden within. All that is known is that the wheels hinge outwards on extensible axles and radius-rods until they are half buried in the underside of the wing engine nacelles. As shown the machine is intended to be *en plein vol* with wheels retracted and it certainly gives an impression of cleanliness.

The extremely small nacelles required to house the minute 40 h.p. Salmson engines are noteworthy. The makers claim that the machine can carry five people on 120 h.p. at over 93 m.p.h., which would indicate that its cleanliness is of the right type, or else that M. Couzinet is an optimist.




**SLIGHTLY DIFFERENT.—The Caudron tri-motor, which departs from normal Fokker design in having the wing engines built into the wing,—where they are probably less efficient than if they were slung underneath.**

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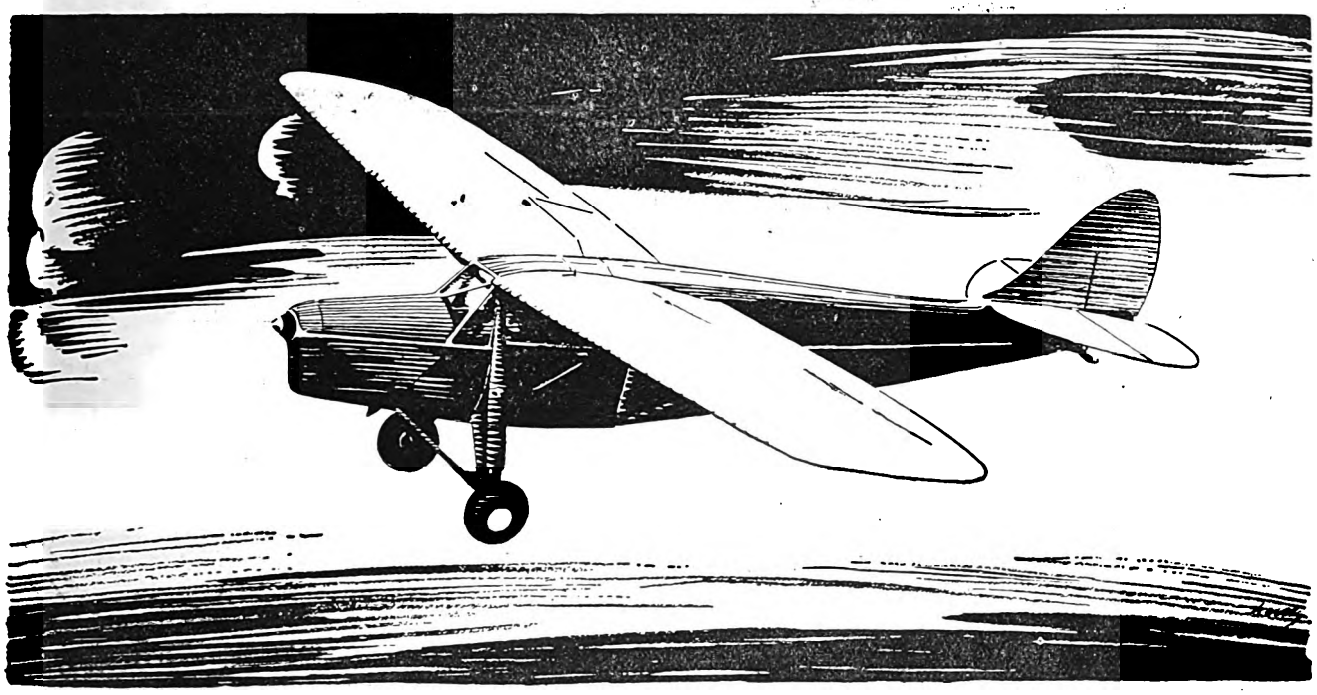

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Its reliability is guaranteed by virtue of its 120 h.p. inverted type de Havilland Gipsy III engine.

Its performance, loaded to 1,750 lbs., is guaranteed as follows:

Top speed : 128 m.p.h.
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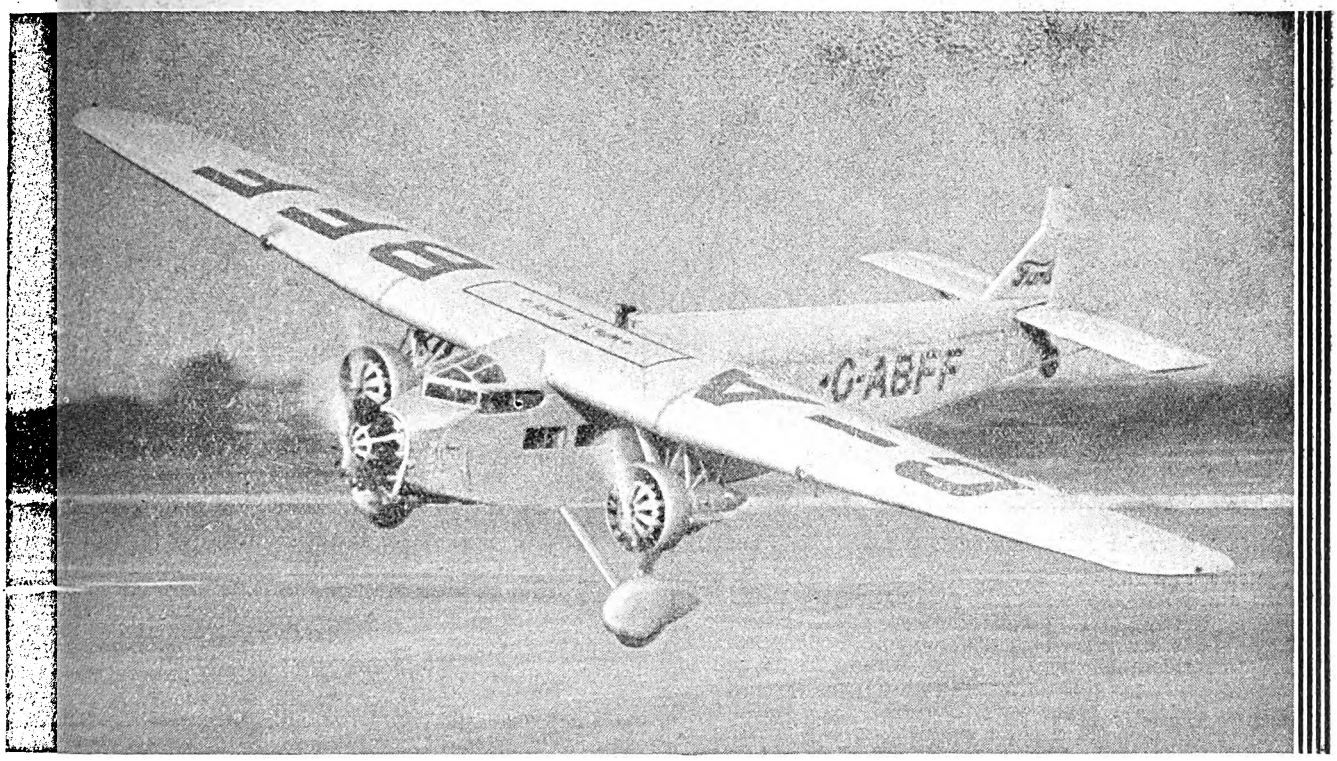


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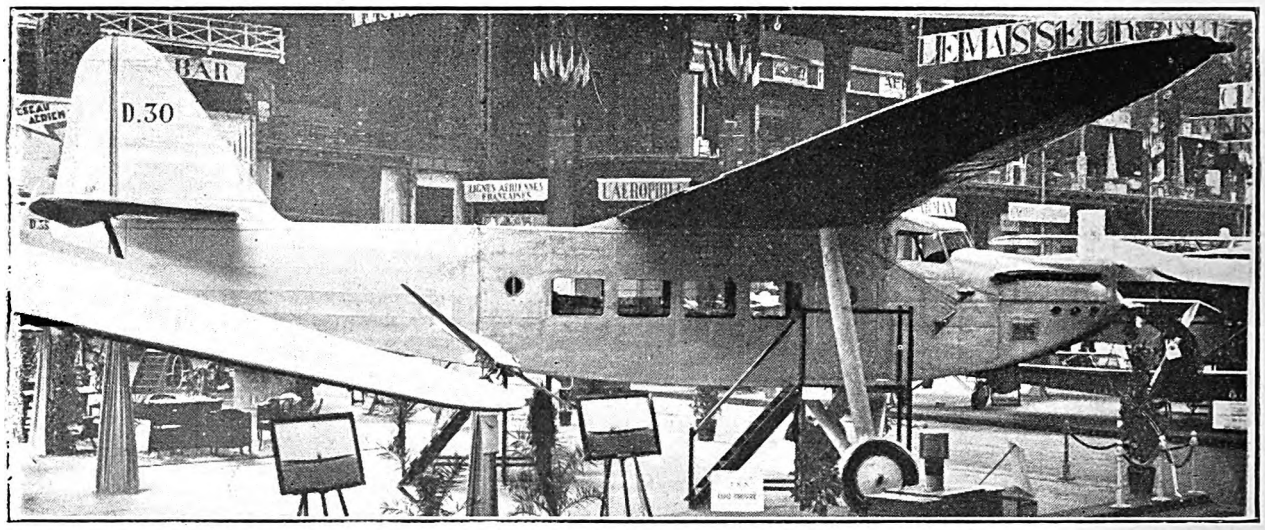



**AFTER A GERMAN PROTOTYPE.—The Dewoitine cabin monoplane which is distinctly of Messerschmitt type.**

**DORNIER (Dornier Metallbauten G.m.b.H.). Stand 13.**

The sole, and ample, exhibit of this firm is the Do.S, with models and photographs of its larger relative, the Do.X.

Although rather less than one-third the power of the Do.X this exhibit is easily the largest aeroplane in the *Salon* and attracts considerable attention on its own merits as well as by the reflected glory of its family connections.

The Do.S is a smaller version of the Do.X with four 600 h.p. Hispano-Suiza engines mounted in two nacelles of two each in tandem. Technically the Do.S is a triplane, but the inefficiency of the stub wings which serve as balancing floats, and of the insignificant connecting aerofoil between the engine nacelles, resolve it into a practical monoplane.

The main wings are braced below by one strut on each side and two sets of double flying-wires from the stub floats. Two sets of landing wires above are attached to the engine structure. The wing is fabric-covered throughout and has three spars. The centre-section carries the engines and projects just beyond the floats, at which point the tips join on.

The hull is typically Dornier and is built of duralumin open sections and plating. A front cabin carries 10 people and a rear one 12. In between are lavatories and luggage compartments. The kitchen is behind. The pilots occupy the front room on the next flat, where there are dual controls and all the usual instruments. Behind them the engineer's compartment has all the instruments for the four engines on two separate panels.

The stub wings of the Do.S are rounded off at the tips and contain the petrol tanks.

The balancing surfaces are similar to those on the Do.X, and the machine is characterised by the same low aspect-ratio as its larger relative. The miniature aerofoil above, and the tail surfaces, are all covered with metal.

The wing loading of the Do.S is something under 14 lbs. per sq. ft.

Very good and highly enlarged photographs are mounted on screens to show the Do.X inside and out.

**FARMAN (Société Henri et Maurice). Stand 21.**

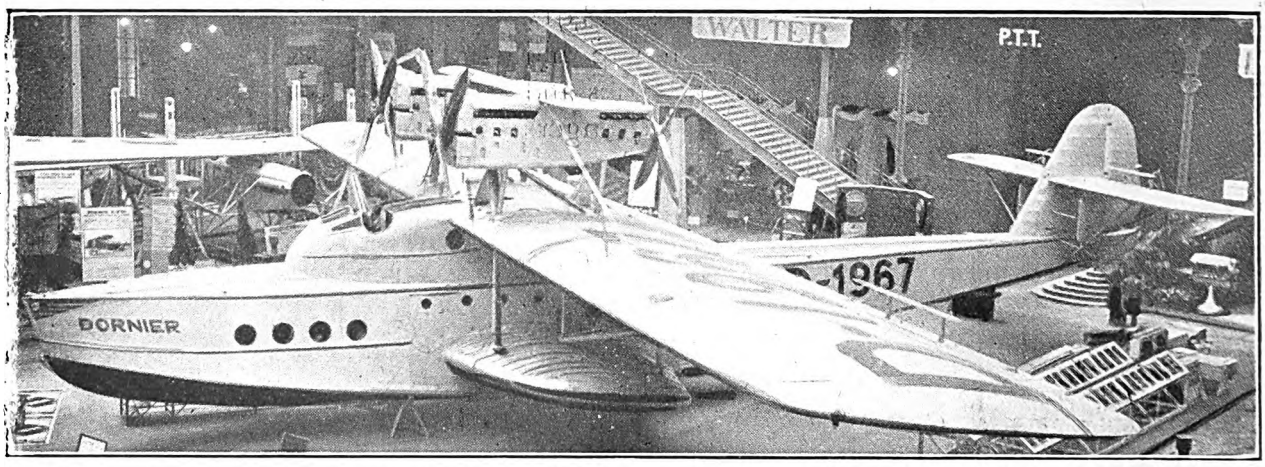
This ancient firm is represented by a very full line of four aeroplanes graduated in size, and all characterised by the typical and unæsthetic Farman rectangularity, relieved only by a partial taper at the wing tips. Their ability to perform is vouched for by recent flights to Saigon, and less recent exploits to Madagascar and other remote places.

The largest machine on the stand is the F.300 three-engined eight-seat monoplane. It has three 230 h.p. Salmson engines and is said to perform creditably on any two. The wing is braced by twin parallel struts and is fabric-covered. The wing engines occupy nacelles of uncompromisingly rectangular section, and an orthodox undercarriage anchors its Messier oleo legs therein.

The rudder carries a device which is common to all but the latest and smallest of the Farmans, the type 230. This is a very narrow metal hinged trailing edge. It is transfixed by three prongs which arise in the rudder itself and curve so as to pass through holes in the metal flap and are distributed along its length. The angle which the strip makes with the rudder can be adjusted by nuts on the threaded ends of the prongs. This is a servo-bias device which functions on the same principle as the servo trailing-edge which was used to operate the rudder on certain large Farman aeroplanes. The turning effect of the slip-stream can be neutralised by adjusting the trailing strip so that the rudder gives itself the necessary bias. It is ingenious, and one excuse for the unpleasing straightness of a Farman rudder.

The next in order is the F.190, a five-seat cabin monoplane with the geared 240 h.p. Lorraine engine. Incidentally the huge Levasseur metal airscrew has no room to revolve with the existing undercarriage, so it is evidently an innovation with the geared engine. In practice either the machine must have a higher undercarriage or it must have a four-blade screw.

This machine is typically Farman in its ply-wood box fuselage and fabric-covered, strut-braced wings. Everything is rectangular, except the scalloped edges.




**THE LITTLE SISTER.—The Dornier Do.S, which is a smaller sister of the Do.X. This is a modernised version of the Super-Wal of some three or four years ago.**

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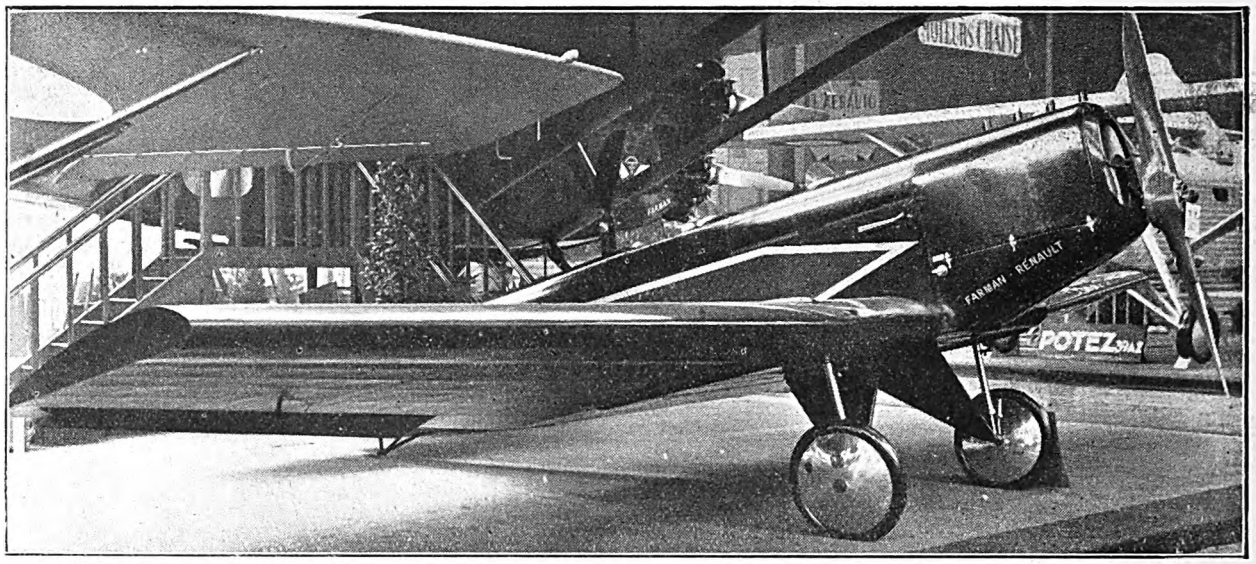
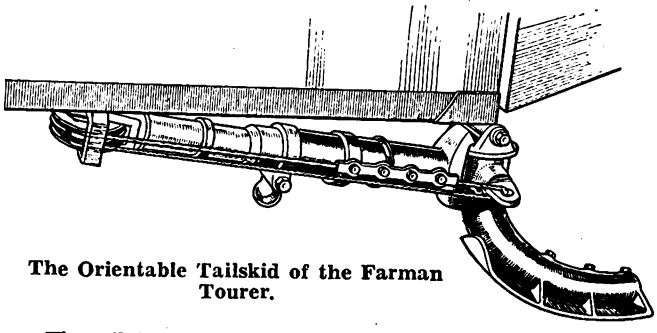



A SPORTS MONOPLANE.—The new Farman light aeroplane (90 h.p. Renault) with the typical Farman sawed-off wing-tips. A suggested name is the "Type Carré," or "All Square at the Turn."



The Orientable Tailskid of the Farman Tourer.

The pilot has a nice range of instruments very decoratively mounted in a sort of tortoiseshell panel, wheel control and none too much visibility.

The passengers have two doors, both on the port side, and a series of round portholes through which to look. The decoration of the cabin is well-intentioned, but as it probably does not affect the flyability of the machine is best left without comment. The performance and stability of the aeroplane is spoken of very highly, and its price is in the range of £1,300 to £1,500.

The Farman F.200 is an open cockpit high-wing monoplane and has accommodation for two in tandem or three with two passengers side by side. As a two-seater it is used for training and touring.

In general construction and appearance it is unmistakably Farman. The one exhibited has a 100 h.p. Hispano-Suiza six-in-line water-cooled engine, but Salmson or Lorraine models of similar power are also used. It has dual controls when used as a tandem two-seater.

The Farman 231 is the youngest of the Farman line and breaks away from the stereotyped form. It is a tandem two-seater cantilever low-wing monoplane of wooden construction and plywood covering throughout with a strong external resemblance to the Caudron 195. But it is considerably smaller, and has a larger wing area and seems lighter although very sturdily built.

The ply-wood wings taper to a cut-off end and are detachable by the removal of a rather extensive array of bolts. The centre-section passes right through the fuselage and the rudder pedals are situated at the bottom of wells in its structure.

The tail unit is full cantilever and covered with ply-wood in a style very much like the Caudron. This little machine is very neat and clean. A high speed is claimed for it and its price is less than £500 with the 95 h.p. Renault engine. It flies quite well with the 40 h.p. Salmson.

The Farman stand is finished off with a large placard recounting the many creditable flights of Farman machines.

**FIAT (Aeronautica d'Italia). Gallery A. Stand 3.**

Two Fiat two-seat light aeroplanes are shown on this stand, one open and the other a cabin job of similar type.

The A.S.2 is a slightly improved A.S.1, a fairly well-known high-wing, strut-braced monoplane. It has an 85 h.p. Fiat A.50 radial engine, and is a conventional tandem two-seater of its class.

The striking thing about the open specimen is the colour-scheme of different shades of blue blending into each other with bold angular strokes on fuselage and wings.

The Fiat T.R.1 is a two-seat cabin monoplane which is very similar to the A.S.1. The occupants are accommodated in tandem seats with the pilot in the rear one. Windows are provided round the cabin but those on the doors only cover half the space and are slightly dished out in an effort to eliminate possible draughts. The cabin has four doors, two on each side.

The main fuel tank is mounted in the wing directly over the passenger but the pilot has a circular roof panel. The pilot is provided with a full set of instruments but all that confronts the passenger is a naked auxiliary petrol tank.

The undercarriage is of the divided type with the compression legs anchored to the front wing bracing struts.

The T.R.1 is fitted with the 95 h.p. Fiat A.50S radial engine.

**FOKKER (N.V. Nederlandsche Vliegtuigenfabrik). Stand 9.**

This concern exhibits two types, a large civil passenger type, familiar in all but its extra size, and a standard military reconnaissance machine.

The big F.IX bears the name of the K.L.M. (Royal Dutch Air Lines) and is the second of this type to be delivered to them. It has three Gnôme-Rhône Jupiter engines of 450 h.p. each, and has accommodation in a large cabin for 18 passengers. It differs from the first of the type in having the wing set further back, which gives it a proportionately longer nose.

The construction follows ordinary Fokker practice by using a one-piece wooden wing covered with three-ply and a welded steel-tube, wire-braced fuselage.

The upper cylinders of the nose engine are capped with small individual cowlings, evidently to keep oil from blowing back and fouling the windscreen.

The military reconnaissance three-seater seaplane, known as the C.VIIIW, is a standard type in use for some time. It has a 450 h.p. Lorraine engine of the broad arrow type, and a flat radiator in front of the engine, a notion which ought to have been dead and gone six or seven years ago.

The wing and fuselage are of standard Fokker construction, but wing bracing is used, apparently to lend support to the float structure rather than to the wing itself. Pyramids of steel tube arise from the fuselage and centre section and project sideways under the wings. From the apex they are braced by parallel struts towards the wing-tips. Two long, single-stepped wooden floats are mounted, each on its separate tube structure, at the outboard end of the pyramids referred to, and are then braced back to the fuselage. The result has a complicated look, but gives a very wide track.

The three seats are in three tandem cockpits.

**JUNKERS (Junkers-Fluzeugwerke A.G.). Stand 13.**

The exhibit on this stand is a Junkers Junior, with Armstrong Siddeley Genet engine. The aeroplane is sectioned to show its construction, the model of the 40-passenger G.38, and a model of its interior engine mountings which permit access in flight.

The Junior is most excellently prepared for show. One wing is sectioned to expose the spars, which, instead of the five-tube type habitual to Junkers, consists of two tubes, one

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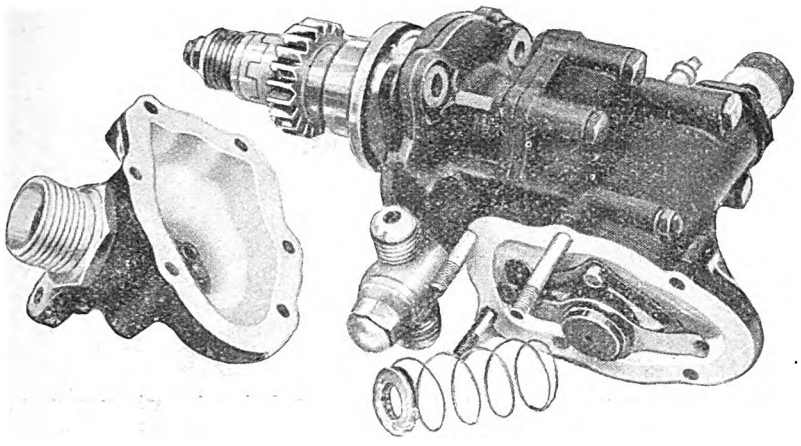

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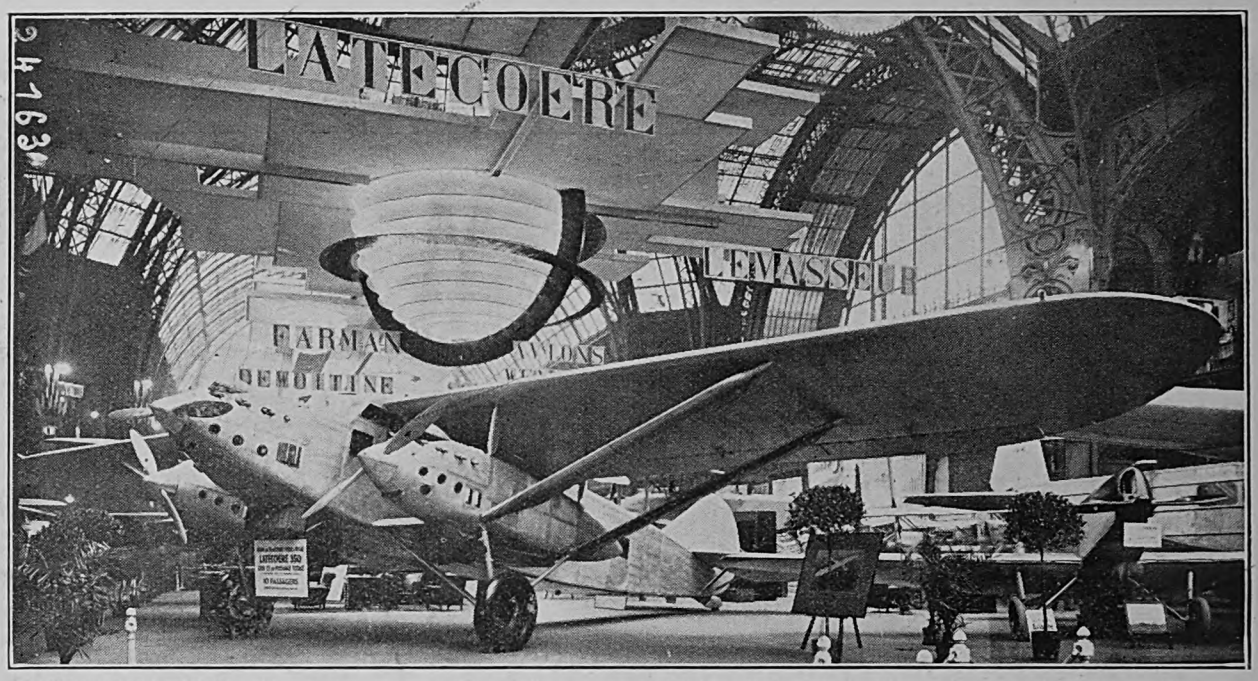



**FAST TRANSPORT.—The Latécoère version of the popular Fokker design, but with water-cooled engines. This picture gives a good idea of the futuristic roof decorations of the Grand Palais.**

above the other, connected by a web which is corrugated vertically, and so approximates in effect to the famous Vickers "wandering web." The fuselage is stripped along one side to show the inside of the cockpits, which are beautifully upholstered and fitted up. The undercarriage is fitted to show one wheel and one float, and gives a curious impression of a gentleman who has lost a shoe in the bath. The 80-88 h.p. Genet and metal airscrew are polished till they dazzle. Altogether it is a most convincing demonstration of simplicity, strength and workmanship, and is one of the few really pleasing exhibits in the show.

**LATECOERE (Société Industrielle d'Aviation). Stand 23.**

The most interesting machine on the Latécoère stand is the Lat. 28 seaplane, which is the duplicate of that historic seaplane in which M. Mermoz crossed the South Atlantic with the first regular air mail of the *Compagnie Générale Aéropostale*.

The fuselage is of metal and the wings are fabric-covered. The motor is a 600 h.p. Hispano-Suiza geared down to a tremendous metal airscrew of the Levasseur-Reed type.

The floats, which impress by their unusual length, are of duralumin and are attached to the fuselage by streamlined "N" struts braced transversely with wire.

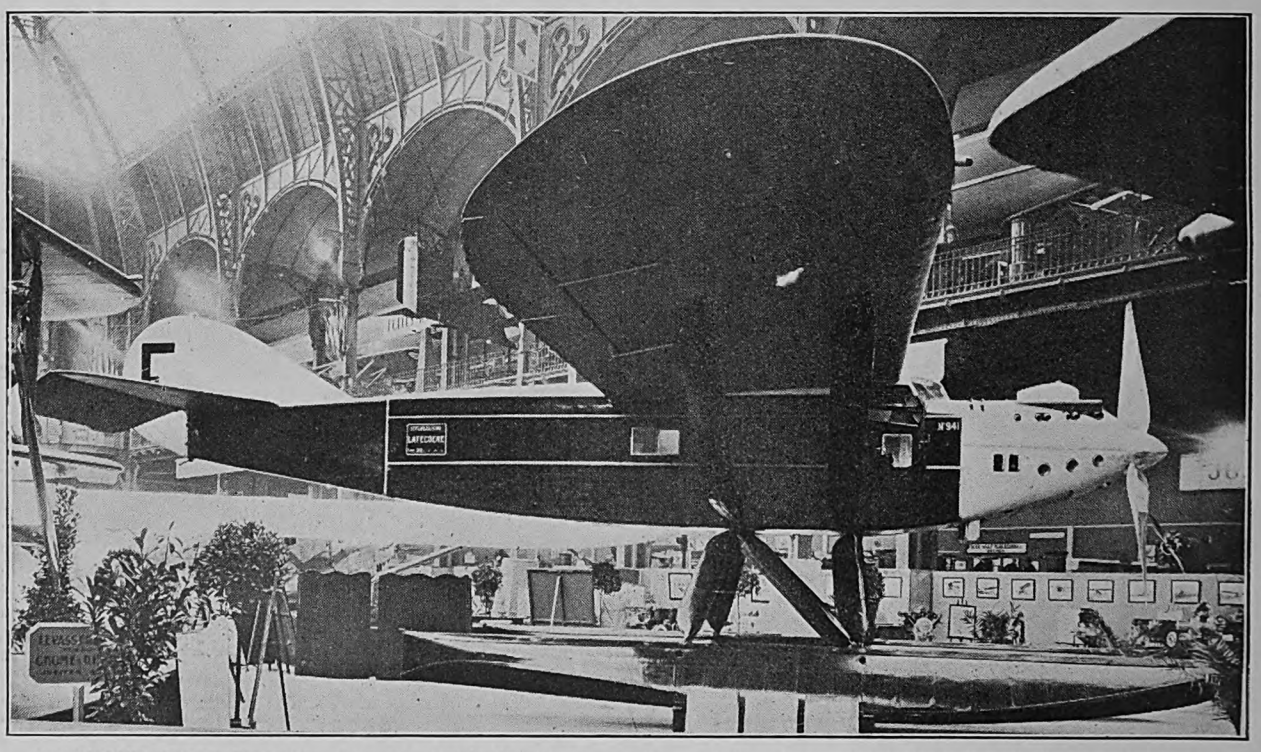
This machine has a maximum speed of 150 m.p.h. and in June of 1930 held eleven World's records for weight-carrying.

The other exhibit is a newer type, the Latécoère 350, with three 400 h.p. Hispano-Suiza motors and accommodation for two pilots, eight passengers and mail.

This is another of the many examples of high-wing trimotor practice, which has suddenly become very popular, and is, in fact, the least efficient way of using engines.

The structure of the wing is duralumin, but wooden ribs are used and the covering is fabric. The front part of the fuselage is a metal box structure, and a duralumin frame covered with fabric forms the after-part.

The wings are braced by double flying-struts which spring



**A MAKER OF HISTORY.—The big Latécoère float seaplane of the type which is being built for the trans-Atlantic service of the Compagnie Générale Aéropostale. The first of this type was the first aeroplane to carry ordinary mail across either of the Atlantics,—when M. Mermoz made the first and so far the only flight between Dakar in Sénégal and Port Natal in Brazil on May 13, 1930.**

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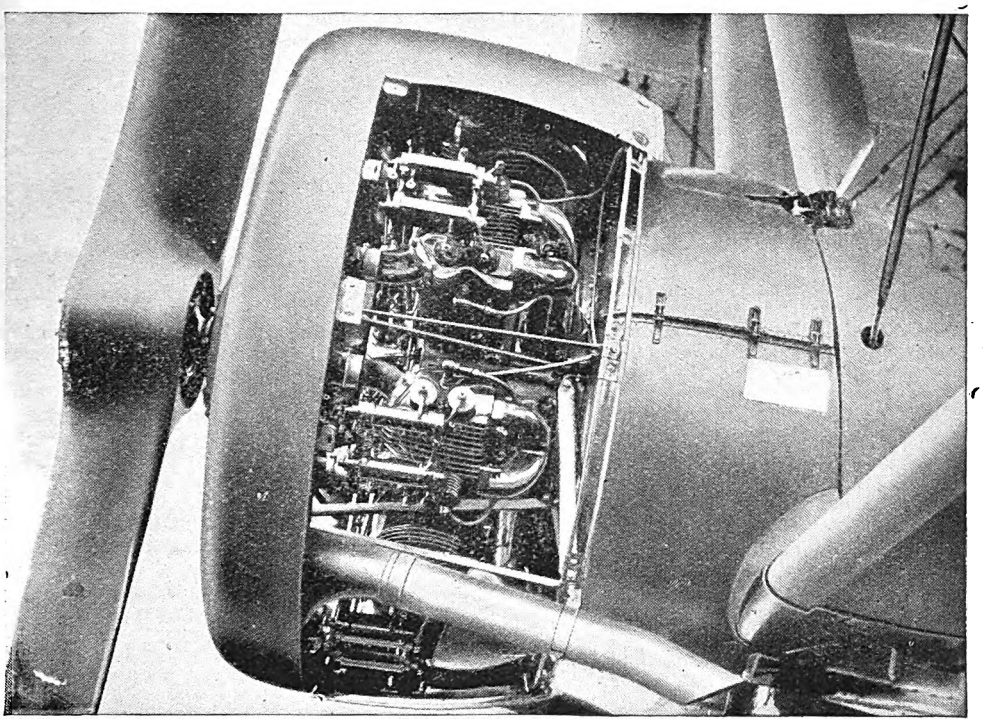
# ENGINE ACCESSIBILITY



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# GREAT FLIGHTS—1930

on

# K·L·G

PLUGS

**MR. FRANK CHICHESTER'S LONE FLIGHT TO AUSTRALIA**
in a Gipsy-engined D.H. Moth.

**ENGLAND TO AUSTRALIA IN A SPORTS COUPE MONOPLANE.**
Flying Officers Piper and Kay in a Hermes-engined Desoutter sports coupe monoplane.

**THE DUCHESS OF BEDFORD'S FLIGHT TO THE CAPE & BACK IN 20½ DAYS.**
Capt. C. D. Barnard piloting the Bristol Jupiter-engined monoplane "The Spider."

**SOLO FLIGHT TO AUSTRALIA BY MISS AMY JOHNSON, C.B.E.,**
in her Gipsy-engined D.H. Moth "Jason."

**SOLO FLIGHT TO MALTA AND BACK IN TWO DAYS.**
Capt. C. D. Barnard in a Gipsy-engined D.H. Puss Moth.

**KING'S CUP AIR RACE (FOR THE NINTH YEAR RUNNING).**
Miss Winifred Brown in a Cirrus III-engined Avro Avian.

**FIRST FLIGHT TO AFRICA & BACK IN TWO DAYS.**
Capt. C. D. Barnard in a Gipsy-engined D.H. Puss Moth.

**PARIS-NEW YORK NON-STOP FLIGHT.**
First direct flight from Europe to America, by Capt. Costes and Lt. Bellonte on a Breguet Hispano Suiza-engined bi-plane "The Question Mark."

**ENGLAND—CAPETOWN IN 9 DAYS.**
Mr. R. F. Caspareuthus in a Gipsy-engined D.H. Puss-Moth.

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the nose of the hull, and along its back in the rear run a collection of control cables which disperse through a mass of pulleys near the tail and rather spoil the neat appearance of the machine. The cockpit is fitted with high head-rests and heavy padding, as is the P.L.XI, for the comfort and safety of the occupants when being catapulted. The main wing is fabric-covered.

The display of airscrews includes two- and three-bladed types. The latter, and some of the two-bladed ones, have detachable and adjustable blades, while some are cast in monobloc and some are forged from flat blanks and machined to shape. There is a small sample of the last type alongside a 15-ft. specimen for a geared 600 h.p. engine.

The Levasseur variable pitch airscrew is a fairly compact but somewhat heavy piece of mechanism. The pitch can be varied through about 15 degrees by turning a small crank from the cockpit while flying.

As usual, the Levasseur exhibit shows the use of brains, a commodity which seems to be rather rare in the French aircraft industry at present.

**LIORE ET OLIVIER (Etablissements). Stand 18.**

This firm shows two complete machines, the Le O. H.22 amphibian flying-boat, and the Le O. 203 four-engined bombing biplane, besides the hull and tail unit of the Le O. H.27 four-engined commercial flying-boat.

The Le O. H.22 is an amphibian flying-boat with a 230 h.p. Gnôme-Rhône Titan radial engine. As exhibited it is arranged as a postal machine with accommodation for a crew of two in an open cockpit in front of the wing.

It is a cantilever monoplane with the engine mounted above the hull in a streamlined nacelle and driving a pusher airscrew. The hull, which is of metal construction, is of the flat-sided type with two steps.

The amphibian gear consists of a stout torque-tube which passes through the hull and carries at its extremities, and close to the sides of the hull, two forks between which are mounted the wheels. The outer ends of the main torque-tube are supported, outside the fork, by two Vees, running down from the underside of the wing surface. Presumably the torque-tube is revolved mechanically and locked positively inside the hull, for there is no outside evidence of why the wheels should stay in their "down" position.

The tail-unit consists of a monoplane tail-plane which is mounted on top of a fin built integral with the hull. At its extremities are the twin rudders.

The Le O. 203 is a four-engined bombardment biplane, which is derived from the Le O. 20, one of the standard twin-engined bombers of the French *Aéronautique Militaire.* The four engines are mounted in tandem pairs on either side of the fuselage. Except for the power plant, the machine is almost identical to the Le O. 20

The machine is exhibited with two of the new 300 h.p. Gnôme-Rhône Titan-Major engines as the tractor engines and two 270 h.p. Renault radials as the pusher engines. Actually the machine may be fitted with any engines totalling 1,200 h.p. and the mixed power-plant is only a demonstrative of its versatility. There is nothing to indicate how the rear engine in either tandem is to be kept cool if the front one stops. Probably it is not.

The H.27 in its completed state is to be a four-engined long-range commercial monoplane flying-boat of all-metal construction. For exhibition purposes, only the hull, graphically described by one of its admiring compatriots as *une coque gigantesque metallique,* is shown, and this is identified with the Lioré-et-Olivier stand by the fact that its tail-post rests thereon. The rest of the hull rears up across the public gangway, and the nose is located somewhere near the upper balcony.

The hull is a flat-sided, Vee-bottomed metal structure with two streamlined steps. It is built up of a number of transverse frames placed fairly close together and covered with flat sheet duralumin.

The tail-unit is mainly of monoplane type, but below the tail-plane and on each side of the fin are a vertical and horizontal trimming surface.

**LORRAINE-HANRIOT.** (See section pertaining to S.G.A.)

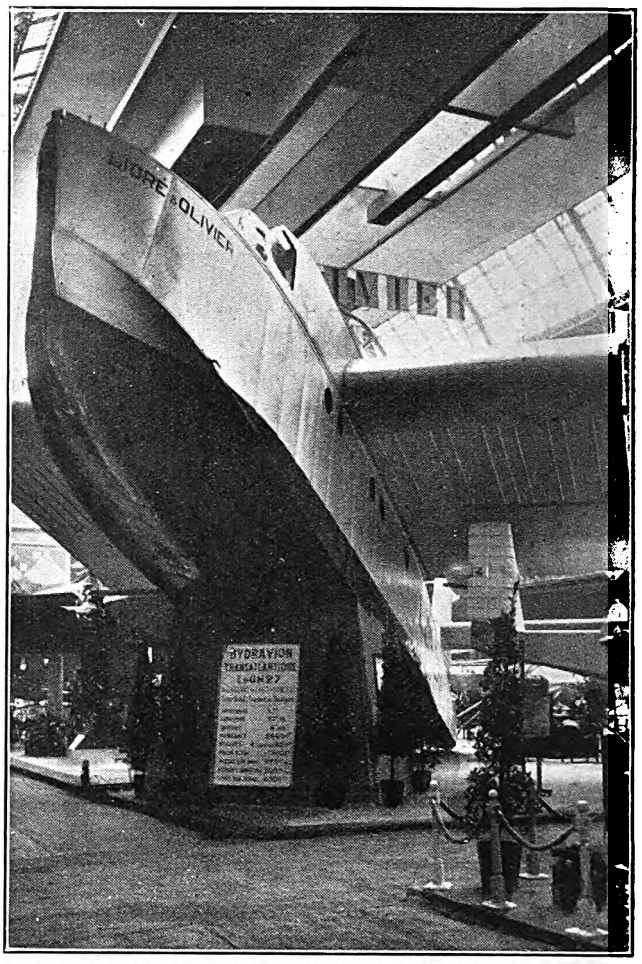
**MINISTERIA AERONAUTICA. Gallery B.**

On the official Italian Government stand are shown three light aeroplanes, the Romeo Ro.5 and Ro.5s two-seat monoplanes and the Breda 15s monoplane.

Both the Romeo monoplanes are two-seaters, but the Ro. 5 has open cockpits and the Ro.5s has a cabin, otherwise they are the same. Both are fitted with the 85 h.p. Fiat A.50 radial engine.

The fuselage is of steel tube covered with fabric on the sides and bottom and a sheet-metal fairing on the top. The wings are wooden, fabric-covered and braced by two parallel flying struts and can be folded by unshipping the front pair.

The fore-and-aft trim of the machine is adjusted by a crank, which sets the ailerons for greater or less incidence




**THE "COQUE GIGANTESQUE METALLIQUE."—The huge all-metal hull of the Lioré et Olivier, which is intended for trans-Atlantic work.**

together, thus adding to or taking from the lift of the main wings. The same adjustment is said to give a choice in degree of lateral control, although it cannot logically perform both functions at once. Brakes are fitted to the wheels.

The cabin version is luxuriously upholstered in green plush, has windows inserted in all the inter-strut spaces of the centre-section, and a transparent roof over the rear cockpit hinged to the wing at its front edge. The ailerons in this model run the full length of the trailing edge.

The Breda 15s is a development of the type which is fairly well known in England. It differs from the earlier type in that the wings are now elliptical in plan form, are bereft of flap gear. The wing-bracing is now simplified to two parallel struts cross-braced with wire, without the intermediate strutting of the earlier model. The occupants are seated in tandem with the pilot in the rear seat. Both seats have openable panels in the roof. Doors to each seat are fitted on the left side of the cabin.

The wings are arranged to fold complete with the rigid bracing struts, the bottom ends of which are inter-connected by a steel tube, so that the intermediate cross-bracing may remain undisturbed.

The machine is fitted with the Czechoslovak 120 h.p. Walter radial engine.

**MORANE-SAULNIER (Société Anonyme de Constructions Aéronautiques). Stand 2.**

The best of the exhibits on the Morane stand is the De Havilland Puss Moth. It attracts a great deal of attention and was sold on the first day to M. Bailly, who should know a good aeroplane when he sees one as he has flown to Madagascar and other strange places chiefly in Farman 190 monoplanes.

There was some misunderstanding about its presence on the stand and a large plant was used to conceal the British registration mark on the fuselage, but the brilliance of its cream and red Titanine finish stood out best when viewed from the gallery, where its full lettering could not be ambushed.

As shown it has the new 1931 characteristics. Dunlop semi-low-pressure wheels with Bendix brakes, a panel in the windscreen to open under conditions when the glass is obscured, a new ventilation system, rudder adjuster, quickly adjustable prop for the engine cowling, and the latest in

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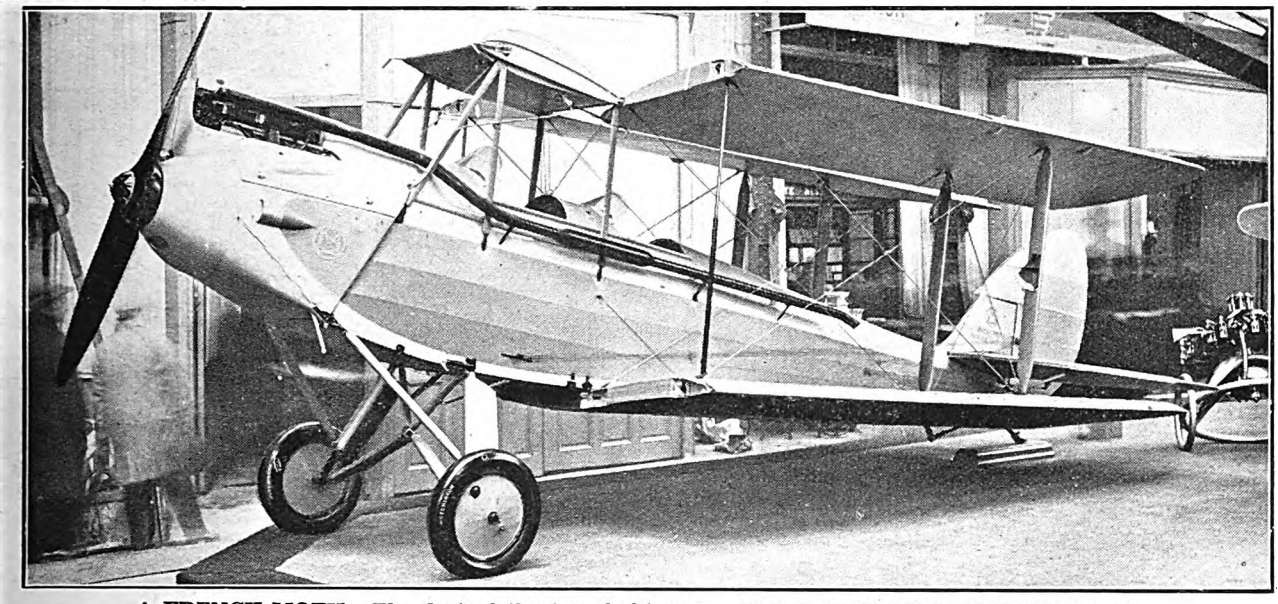

**A FRENCH MOTH.—The first of the type built under licence by the Morane-Saulnier firm.**

interior comfort. There is nothing in the Show to compare with it for workmanship, finish or practical usefulness.

The Morane-Saulnier products include the Moth built under licence, the M.S.230, M.S.224 and the M.S.301.

The M.S.230 is a tandem two-seater advanced-training machine with a 230 h.p. Salmson engine. It is the property of M. Detroyat, who has twice won the *Coupe Michelin* on a machine of this type.

Mounted on a pedestal in such a position that it seems to be doing a fatal spin it is striking. Like all Moranes from ancient days it is a high-wing monoplane and it has a pronounced sweep-back. The wing bracing consists of twin parallel struts, cross-braced with wire and entering into the undercarriage design a foot or so from the fuselage.

The construction is of duralumin, and the fuselage is a wire-braced girder of tubular members. In accordance with current French practice there is a rear-view mirror mounted on the thick trailing edge where the wings are cut away in the middle, and on each side of it are many of the instruments,—which are visible to both occupants.

The ailerons occupy a large proportion of the span and are operated from their inner corners, where a rod hinges from a bell-crank on the front spar.

The M.S.301 is an elementary training machine of the same general type as the 230. It is shown with a 120 h.p. Lorraine engine, and like most of the training machines with Lorraine engines it has a starter fitted as standard. It differs from the 230 in having balanced tail surfaces and ailerons of greater span operated at a point near their middles. The wings have metal spars and wooden ribs.

There is a streamlined exhaust-ring on the engine. The wheels have brakes.—Brakes are a very popular fitting, and very few machines in the Salon are without them.

The M.S.224 is a single-seater "*type Jockey*" fighter with a Gnôme-Rhône Jupiter engine. The same high, back-swept wings, and the undercarriage braced to the flying struts, characterise this machine as Morane-Saulnier. The ailerons are the full span of the wings and are controlled by rods which leave the fuselage and slope straight to their trailing-edges.

Both fuselage and wings are of duralumin construction covered with fabric.

Two guns are mounted on the top of the fuselage to fire forward through the airscrew.

The M.S. Moth is of the metal-fuselage type with a Gipsy I engine and a wooden Levasseur airscrew. The workmanship seems to be good but the finish is poor, judged by our standard. Modifications from the orginal are negligible on ordinary inspection.

**A FRENCH PURSUIT-SHIP.—The Morane-Saulnier sin gle-seat fighter.**

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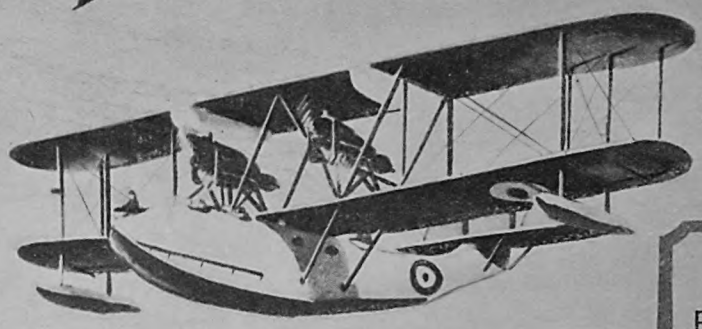
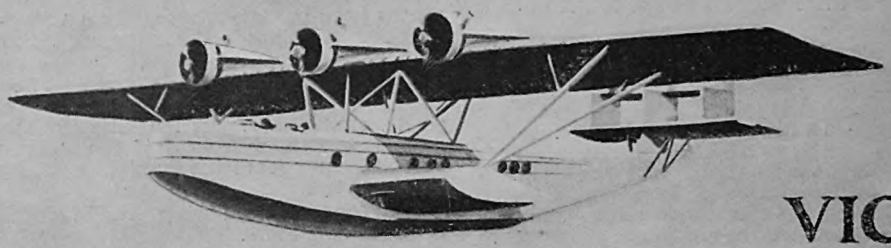
# 12e Exposition Internationale

AU GRAND PALAIS
DU 28 NOVEMBRE AU



GALERIE A
STAND 2
REZ-DE-CHAUSSÉE



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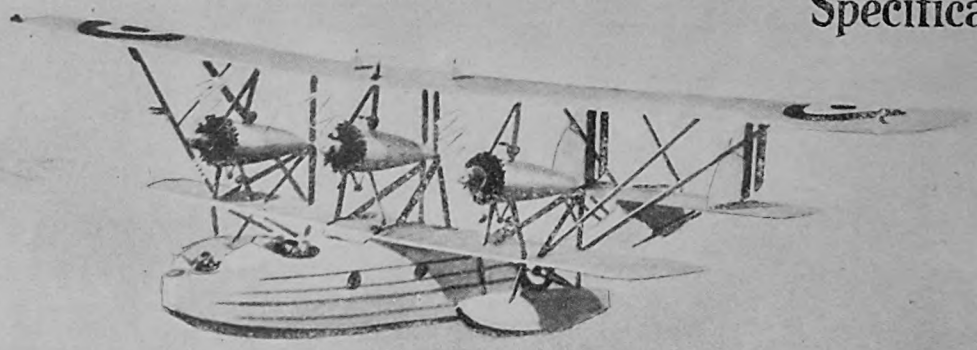

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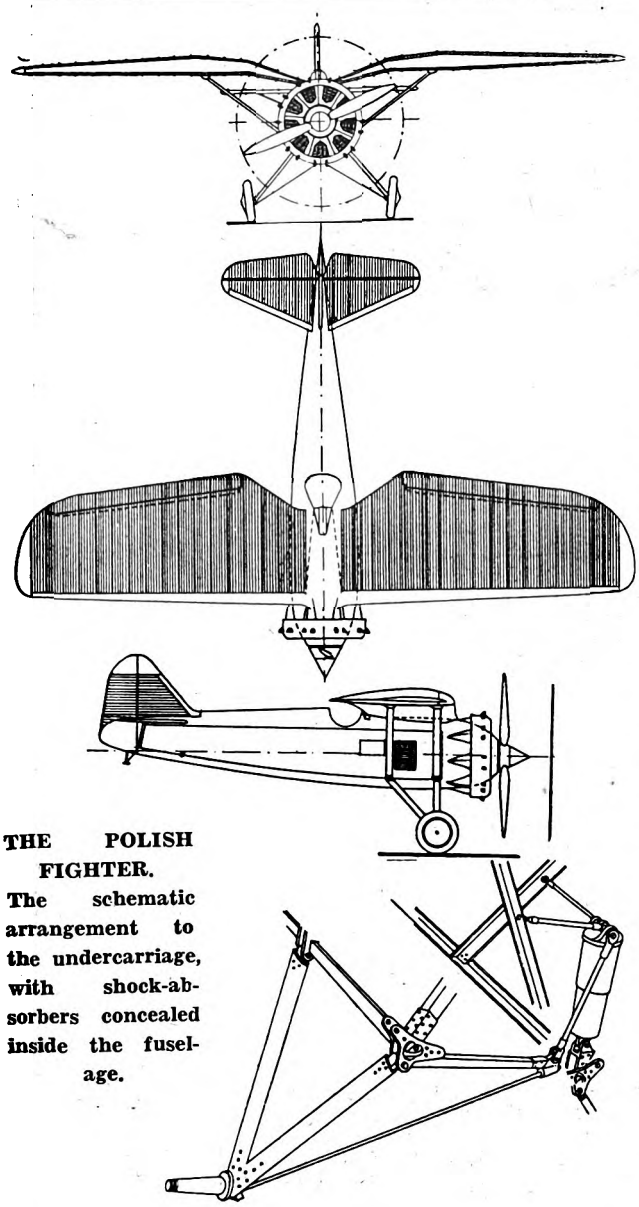
### NIEUPORT-ASTRA.

The Nieuport-Delage aeroplanes will be found under the section devoted to the S.G.A.—the group to which the Nieuport-Astra firm belongs.



**THE POLISH FIGHTER.** The schematic arrangement to the undercarriage, with shock-absorbers concealed inside the fuselage.

### P.Z.L. (Polish National Aircraft Factory).

Stand 3. Gallery K.

This establishment shows two aeroplanes, the P.6 single-seat fighter monoplane and the P.Z.L.2 two-seat advanced training monoplane.

The P.6 is a very striking production and is one of the few things in the Show worth studying. It has been designed to provide the best possible view for fighting. To achieve this end the inner ends of the high-wing monoplane slope downwards and taper inwards to join the top of the fuselage just in front of the pilot's cockpit.

This results in an almost unimpeded forward view over the nose, a very good view either side of the fuselage past the slender sloping wing-roots and a good view above the wings to the sides by a slight banking of the machine.

The machine is entirely of metal, including the covering, —which is about the one fault to be found with it. The fuselage is a rectangular structure faired out to an oval section and covered with flat sheet duralumin.

The wing-structure appears from the outside to resemble the standard Vickers-Wibault method, wherein the covering is applied in fore-and-aft strips with turned-up edges which are rivetted to extensions of the ribs through inverted "U"-sectioned capping strips.

The undercarriage consists of two side Vees which are hinged to the bottom fuselage longerons. Crossed streamline wires connect the apices of the Vees to oleo units located inside the fuselage,—a most ingenious dodge, which results in an undercarriage with less head resistance than any in the World.

The engine is a Bristol Jupiter radial which is surrounded by a Townend cowling-ring. The whole machine gives an impression of well-ordered thought and it is very well made.

It has done considerable flying and in a recent fighter competition held in Bukharest it put up the highest performance, in competition with several prominent Continental fighter types,—and no wonder, for it is miles in front of anything else built on the Continent.

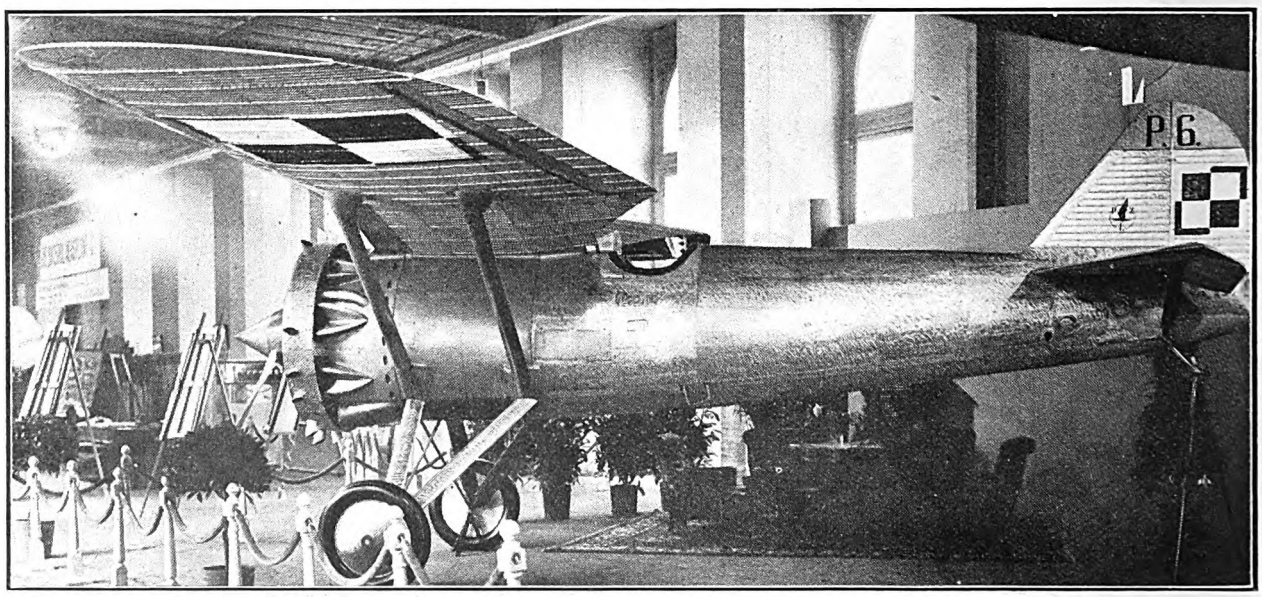
The P.Z.L.2. is less striking in its originality than the P.6, but it seems thoroughly sound. It is a braced high-wing monoplane with a good many features in common with the Westland Widgeon. It has a nine-cylinder Skoda engine of about 200 h.p. and is intended for advanced training.

The steel-tube fuselage is fabric-covered, as are the wooden wings. The tubes are rivetted into welded fittings. The wing struts are of Vee type, and the hinged surfaces on the trailing edge are divided into halves,—the outer one is the aileron and the inner one is a trailing-edge flap adjustable from the cockpit. The slots, which also run the length of the wing, are likewise in halves, one automatic and the other actuated with the trailing-edge flap. The ailerons are balanced by auxiliary surfaces mounted on arms projecting forwards and upwards.

The tail surfaces are conventional and cantilever throughout with the elevator horn working inside the fin. The fuel tanks are in the fuselage. Like many of the French machines this one has a rear-view mirror mounted on the centre-section.

### POTEZ (Société Anonyme des Aéroplanes Henry). Stand 33.

Henry Potez shows three aeroplanes, the Potez 36 light cabin monoplane, the Potez 39 two-seat reconnaissance monoplane and the Potez 40 three-engined transport monoplane.




**ONE OF THE BEST THINGS IN THE SHOW.—The Polish single-seat fighter.**

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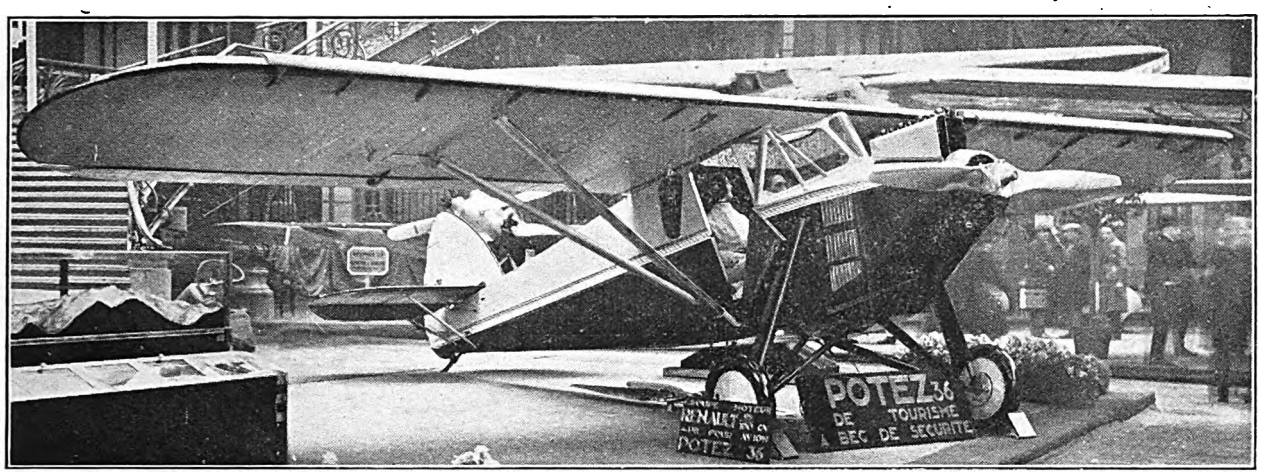



**MR. AND MRS. EVERYMAN.—The Potez cabin monoplane "de tourisme," complete with lamentable dummy passengers.**

The Potez 36 is a two-seat side-by-side cabin monoplane with the 95 h.p. Renault four-cylinder in-line engine. A machine of this type was exhibited at Olympia two years ago and except for the fitting of fixed slots along the whole leading edge of the wing the machine shows little development. It is crude in construction and in comfort. The side-by-side seating makes a wide fuselage necessary and what vision is possible through the Vee windscreen is badly interfered with by certain centre-section struts which seem to have been put in as an afterthought. Seated in the machine are two perfectly dreadful wax models of the French equivalent of Mr. and Mrs. Everyman, which should be enough to put anyone off the idea of private flying in case they looked like that.

The Potez 39 is a two-seat reconnaissance monoplane of all-metal construction and fitted with the 600 h.p. Hispano-Suiza engine. It has a fuselage which is pointed at both ends but which is very deep in the region of the cockpits. The fuselage is built up of a framework of open duralumin sections and is covered with corrugated duralumin sheet.

The monoplane wing which is built up of two steel spars, duralumin ribs and duralumin sheet covering, is carried above the fuselage on an inverted Vee cabane and is braced to the bottom fuselage longerons by Vee struts. The undercarriage is of the divided Vee type with the main compression legs to the top longeron. Brakes are fitted.

The pilot's cockpit is immediately under a cut-out in the trailing-edge of the wing, and immediately behind is the observer's cockpit which is exceedingly roomy. Dual controls are fitted and the observer's controls are such that in the disengaged state they do not interfere with the observer's movements whatsoever.

The Potez 40 is a three-engined Colonial transport monoplane of the *genre* Fokker. The frequency of these foreshadows a depressing sameness on the airways of the World, and a still further prolongation of the period before civil aviation pays,—because of the inefficiency of nose engines.

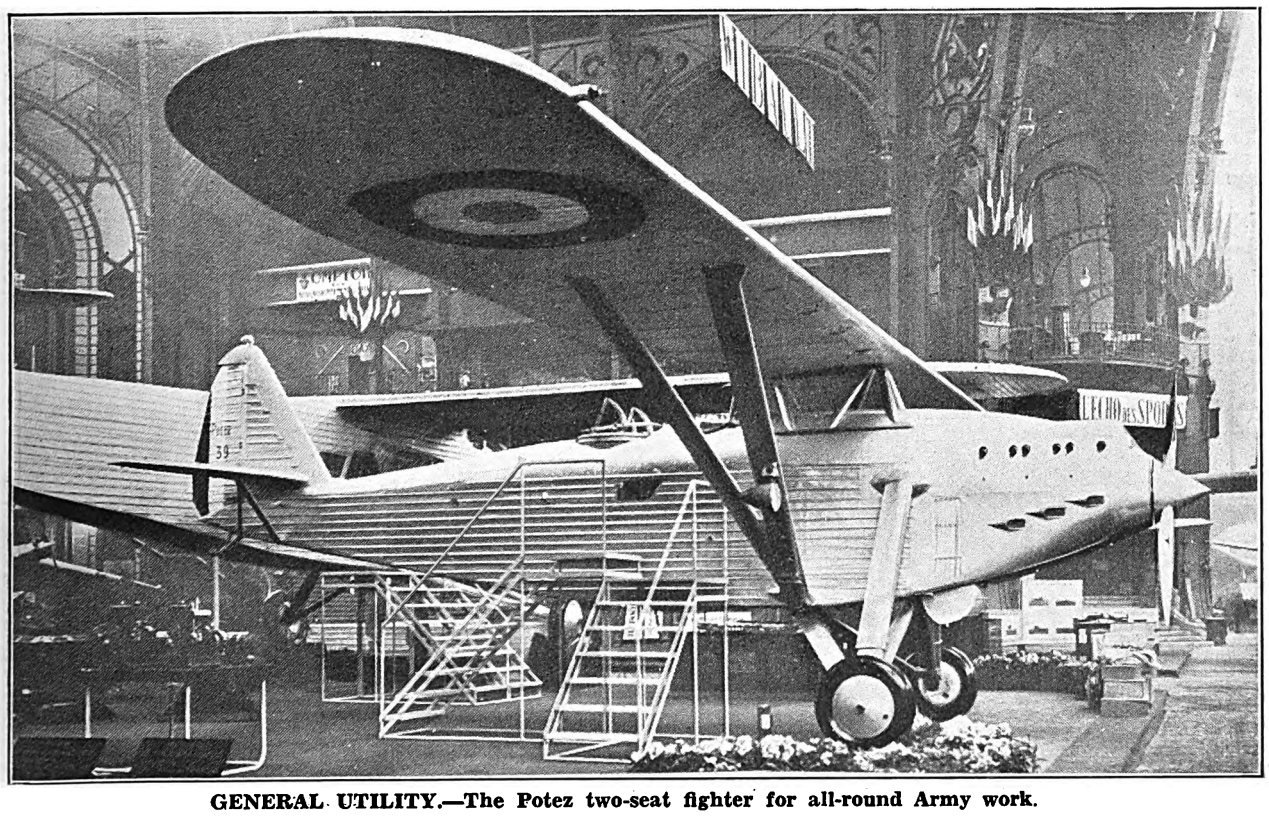
The wing is metal in structure and covering and is strut-braced by two parallel duralumin members on each side of the fuselage. The wing engines are mounted on the front strut and their streamlined fairings taper back to meet the rear one. The nose engine has a swinging mount.

The fore part of the fuselage is built of metal open sections to which the skin is rivetted; a typical Potez method. The rear part is covered with fabric.

Salmson radial engines of 240 h.p. each are used. The cabin accommodates eight passengers and the cockpit has dual controls for two pilots in the strictly standard way.

The undercarriage consists of the usual Vee members based on the lower longeron, with a wheel at the apex, and a compression strut rising to the wing engine mounting.

Among a number of transparencies arranged on the stand is one of the Potez 37.A2, which, although it is not exhibited, is worth mentioning. The machine is the Potez version of the Bréguet 270 "*Tout Acier.*" The fuselage aft of the rear cockpit finishes rather abruptly and the tail-unit is carried on a built-up duralumin tube which springs from the middle of the front part of the fuselage. Except for this feature the 37.A2 is similar in general arrangement and construction to the type 39. It embodies the one poor feature of the Bréguet 270 without any of its goodness.



**GENERAL UTILITY.—The Potez two-seat fighter for all-round Army work.**

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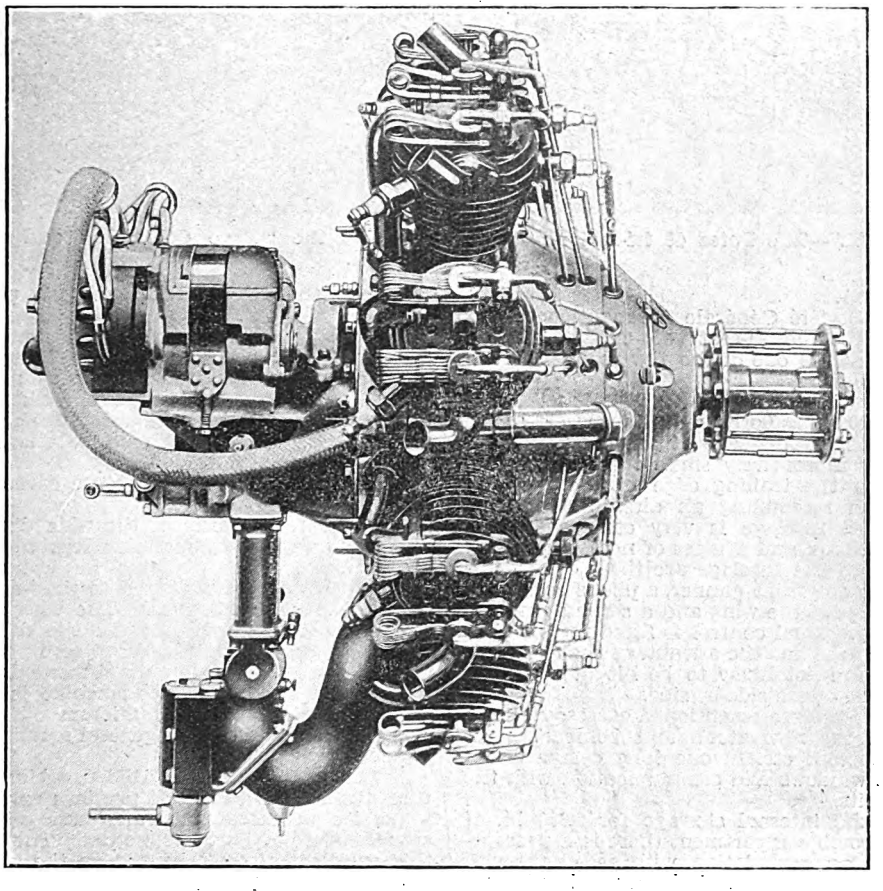

**Proved reliability is a quality which no other advantages can replace. Be the design never so brilliant, the specification never so attractive, the discriminating buyer still appreciates the essential need for a record of proved service. Such a record is the enviable possession of every engine in the British Salmson range. In some cases five, in other cases seven, years of service in every variety of machine, in every possible climate, have amply proved the fundamental soundness of Salmson design.**

***The British Salmson range comprises the nine cylinder 50 h.p., the seven cylinder 105 h.p. and the nine cylinder 135 h.p., all air-cooled radials.***

# BRITISH SALMSON

**BRITISH SALMSON AERO ENGINES**
**NEW MALDEN, SURREY**



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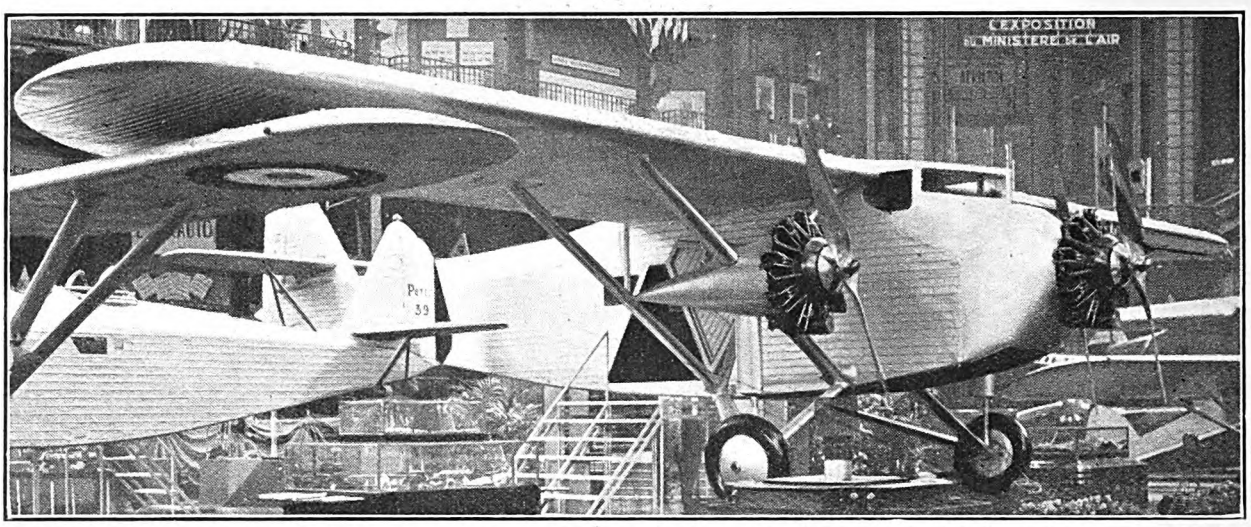



**"GOING NATIVE."—The Potez 40 tri-motor officially known as the "Type Coloniale," and very much of Fokker derivation.**

**S.E.C.M. (Avions Amiot). Stand 36.**

This branch of the Société Générale Aéronautique shows the S.E.C.M.-Amiot 140 M multi-seat twin-engined fighter-bomber monoplane, which is one of the few really interesting machines in the Show.

It is a high-wing cantilever monoplane of all-metal construction with two 700 h.p. Lorraine Orion water-cooled engines mounted in the leading-edge of the wing.

The fuselage is of comparatively small cross-section and has, from the nose to the trailing edge of the wing an excrescence underneath resembling an airship car. This forward portion of the fuselage is very comprehensively arranged for a crew of four and a mass of necessary equipment. Along the top of the fuselage are three open cockpits, one in the nose for the front gunner, a pilot's cockpit in front of the leading edge of the wing and a second gunner's cockpit aft of the wing. Dual control is fitted in this back cockpit. The arrangement has the advantage that being so far apart both pilots are not likely to be hit at the same time in a fight as if they were side-by-side.

Below the fuselage in the aforementioned excrescence are, forward of the wing, the navigator's and bomber's post, camera, wireless equipment etc. in one long compartment which has ample side windows and communication with the nose and pilot's cockpits.

Under the wing is the internal stowage for 2,000 lb. of bombs, and over this bomb compartment there is a passageway leading to the aft accommodation, with access through the wings to the engine-mountings. Behind the bomb-compartment there is a lower gunner's post with a field of fire below the tail.

The construction of the fuselage and wings is of a tube assembled with standard stamped fittings. The wing structure consists of three tube-girder spars with a number of widely-spaced tube-girder ribs to which the outer covering of very finely corrugated duralumin sheet is rivetted. This covering is reinforced with open-sectioned lateral and fore-and-aft stiffeners.

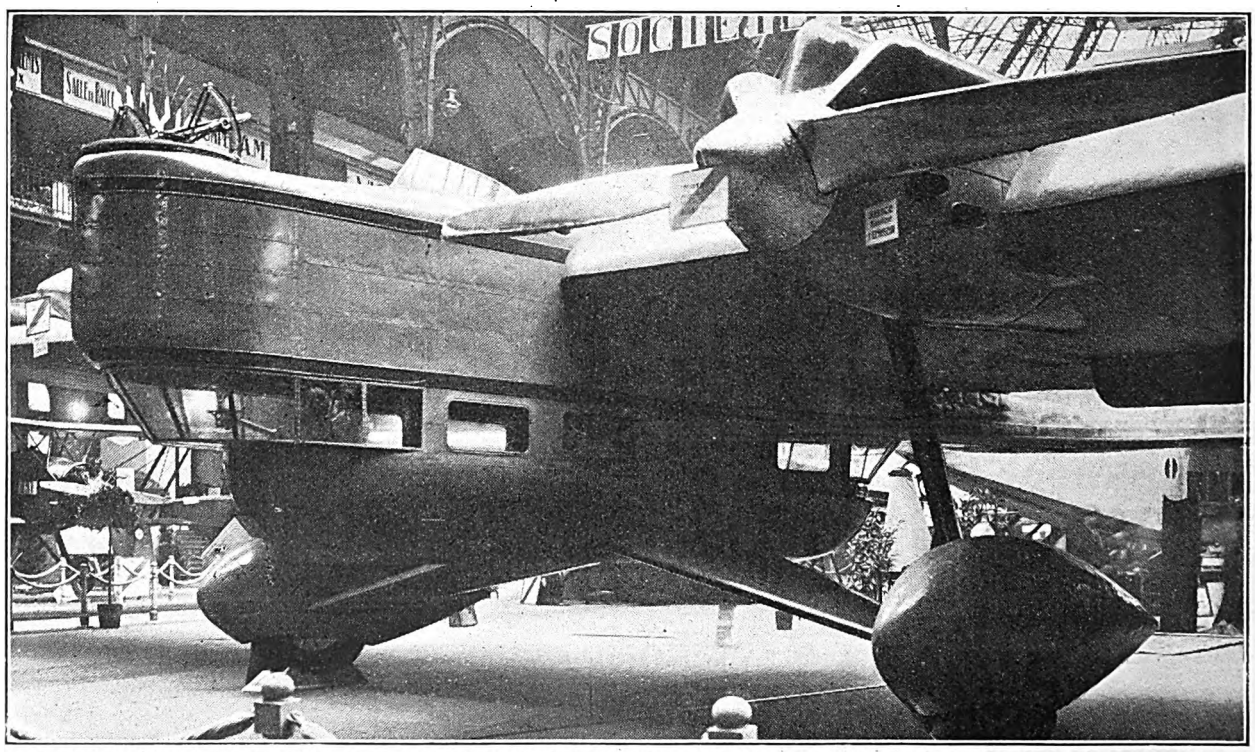
The fuselage is a tube structure covered with flat duralumin sheet.

The undercarriage is of the wide divided type and consists of two main compression legs the top ends of which are anchored to the wing just inside the engine mountings, with the bottom ends hinged to the bottom of the fuselage by aerofoil-sectioned axles. The wheels are cased in large streamlined spats, which serve the double purpose of decreasing head-resistance and protecting the screws from mud.

The tail unit is of the normal monoplane type.

The main feature of this machine is the method of construction which uses the minimum number of different fittings and stampings. Its general arrangement is interesting and well thought out.

An Amiot-S.E.C.M. 122 BP3 bombing biplane of a type that has been exhibited at previous exhibitions is shown on a portion of Stand 27, which was originally intended to accommodate a Ford Trimotor. The incompressibility of this excellent aircraft kept it on the wrong side of a door too small for its passage.



**A CLOSE-UP.—The S.E.C.M. from ground level showing the car below which carries the bombs, navigation apparatus and guns.**

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# PARIS-SAIGON

INDO-CHINA

# FLIGHT

## 3 RECORDS

On November 8th Capt. Goulette and M. Lalouette, the French airmen, flew from Paris in a Farman "190" fitted with a 240-h.p. Lorraine Dietrich engine and made the following records:

Paris to Karachi in 2 days 11 hrs. 15 mins.
Paris to Calcutta in 3½ days
Paris to Saigon in 5 days 3 hrs. 48 mins.

ON

# SHELL

## AVIATION PETROL

Shorts




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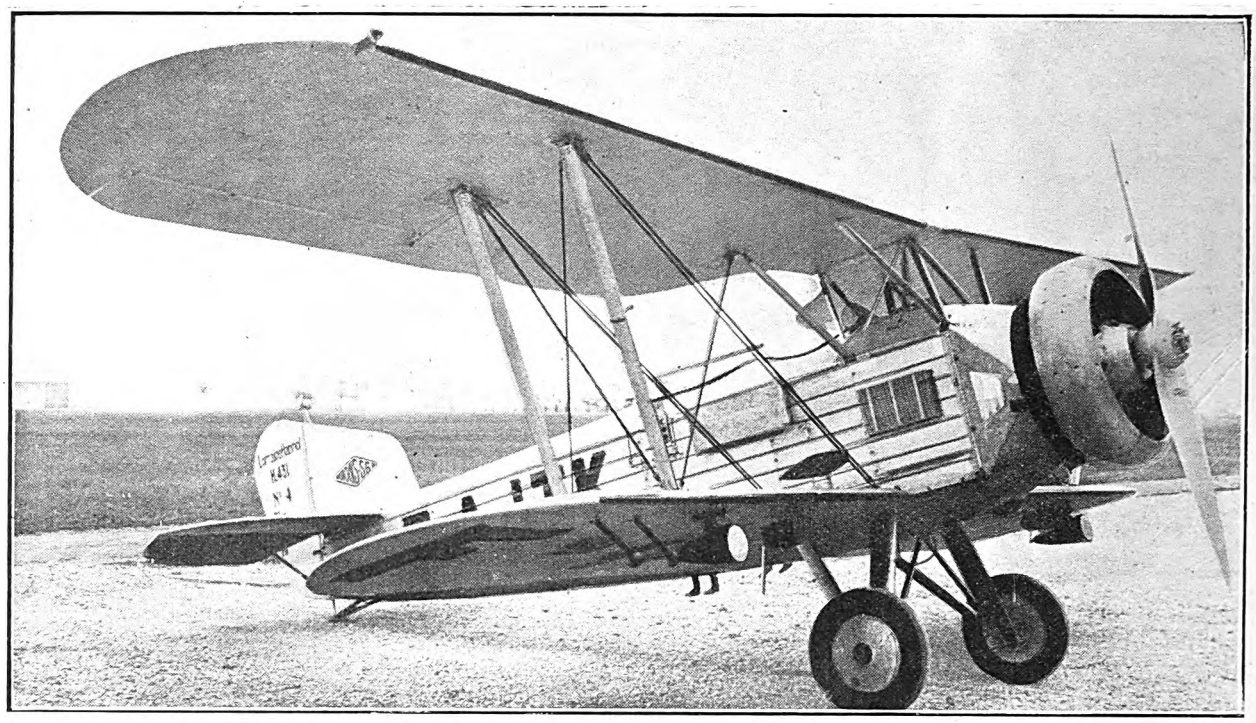

**A SOUND IDEA.—The Lorraine Hanriot two-seater specially strengthened for advanced training.**

**LORRAINE-HANRIOT.** **Stand 26.**

This firm has provided training machines to the French Air Ministry for many years, and their products at the *Salon* show a high degree of specialisation for this purpose. The exhibits include the L.H.431 advanced training monoplane, the L.H.10 elementary training machine, and an *avion sanitaire*, an ambulance monoplane, known as the L.H.21.

The L.H.10 is a high-wing strut-braced monoplane. The bracing is by parallel struts divided into two bays by a cross strut and wire-braced in each. The struts, like the wing spars, are unusually close together. The reason for this may be aerodynamic, but full use has been made of the feature to cut away a very large gap in the trailing edge at the cockpits and thus give an unusual view upwards to both occupants, especially the front one. The wings are wooden frames fabric-covered.

Petrol tanks, with individual gauges, are placed in each wing near the root and there is no centre section. Many of the instruments are placed along the cut-away portion of the trailing edge and include a rear-view mirror.

The ailerons are smallish, inset from the wing-tips and operated from their inner corners.

The fuselage is a wooden girder covered with plywood in the front and fabric behind the rear cockpit. The tail-plane is double strut-braced and the fin wire-braced.

The undercarriage is of the semi-split type and is independent of the wing struts, Brakes are operated independently by two levers, but a master lever can be set to give an equal braking effect on both. The separate levers can still be used for steering. Very complete dual controls are fitted, with voice tubes as part of the equipment. A simple device for holding the controls in neutral by a twist of the handgrip works by allowing the handgrip to slide up the stick, and a projection on its end engages a hole in the under edge of the instrument board.

The engine is a 100 h.p. Lorraine with a self-starter. The latter works by fuel injection, compressed air and a hand-operated "magneto of departure."

The L.H.431 is an advanced training or liaison biplane with a 240 h.p. Lorraine engine.

Its construction is of duralumin sections rivetted up and wire-braced. The covering is of stiffened aluminium panels.

The ailerons are not large and are on the top wing only. The wire bracing is very heavy indeed.

The tail is braced by a single strut below.

This machine can be supplied with a large variety of equipment, including gun ring, photographic apparatus, a hood for blind flying and wireless for two-way communication.

The rudder-bar is tubular and bent into crank form at the ends, and by a rotation arrangement the length of the pilot's reach can be quickly suited.

Instruments are provided in both cockpits.

The L.H.21 is an *Avion Sanitaire* with accommodation for pilot and one stretcher case. It is a cantilever monoplane with the upper wing carried above the fuselage on very widely splayed "W" struts. The wing structure is of wood, and the covering is of wood and fabric. Between the centre-section struts the wing back to the rear spar is covered with plywood and outside the struts, where the wing is partly elliptical in plan form, only the surface between the spars is plywood-covered.

The two full tanks are mounted in the wings in front of the front spar and outside the outer centre-section struts.

The fuselage is built up of square duralumin tubes cross braced with piano-wire and is covered forward with duralumin sheet, flat in the region of the pilot's cockpit and finely corrugated on the sides of the stretcher compartment. Aft the covering is of fabric.

The pilot's cockpit has a deep door on the right side and the stretcher compartment a full side door on the left side. In the roof of the stretcher compartment there is a cockpit opening so that the machine may be flown as a normal two-seater by the provision of a seat under this second opening.

The under-carriage is of the divided type with long compression-legs running up to the top fuselage longerons.

It is fitted with the 120 h.p. Lorraine radial engine.

**NIEUPORT-ASTRA.** **Stand 10.**

On this stand are shown an eight-passenger transport, a four-passenger commercial monoplane and a single-seat fighter.

The N.D.540 large transport is a most workmanlike job with very fine finish in the natural metal, and suggests the influence of Fokker and Messerschmitt in about equal parts.

The machine is cantilever throughout and the sharply tapering wing seems to comprise what is really a large box spar with leading and trailing edges added. The surfaces are of metal with spaced corrugations for stiffness. The ailerons are very long and divided into two separately-controlled halves.

The fuselage is of open duralumin sections with rivetted covering similar to that on the wings in the front half. Behind the cabin the covering is of fabric and the whole rear section is detachable. The tail surfaces are fully cantilever and covered with metal.

The undercarriage is simple and good, albeit very orthodox. Two strong streamlined metal V's carry the wheels, and the usual Messier compression legs slope upwards and slightly backwards and inwards to meet the wing very near the fuselage.

The 600 h.p. geared Lorraine water-cooled engine is mounted in the nose with a large radiator in front of it.

The N.D.641 is a wooden machine throughout. The wing is fully cantilever, covered with plywood, and of elliptical plan. It is slightly bi-convex. The tail surfaces are also of plywood.

The fuselage is a plywood box with seats for four in a cabin which is rather small and somewhat difficult to get into by the method of folding up parts of the front seats. There are dual controls for two pilots in front.

The engine is a 240 h.p. Lorraine on a swinging mounting much as in the old Bristol practice.

The undercarriage is a very normal split gear attached entirely to the bottom of the fuselage and includes brakes.

The N.D.82, C.1. is a single-seat fighter and is described as a sesquiplane. It is an effective-looking all-metal machine with a very streamlined monocoque fuselage and a 500 h.p. Lorraine water-cooled engine.

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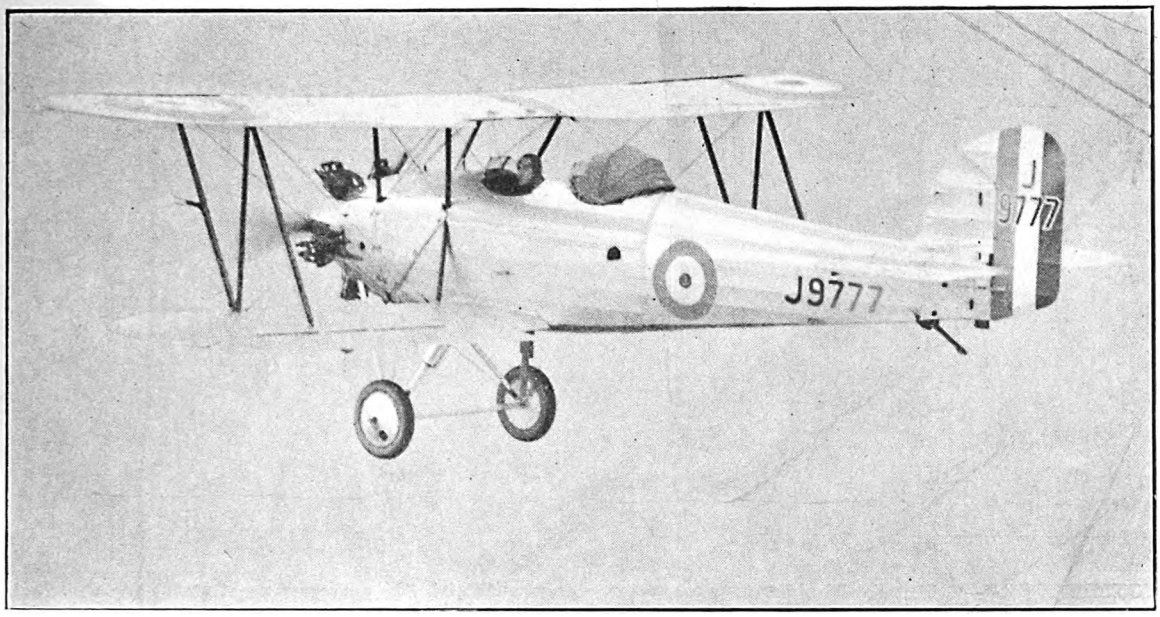


"Flight" Photograph.

The Hawker "TOMTIT" with Mongoose Engine and "blind flying" equipment fulfils all the exacting requirements of Training Aircraft. The performance, structural features, easy maintenance and economical service render it the ideal type for ab initio and advanced training.

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*SPECIALISTS IN MILITARY AIRCRAFT,*

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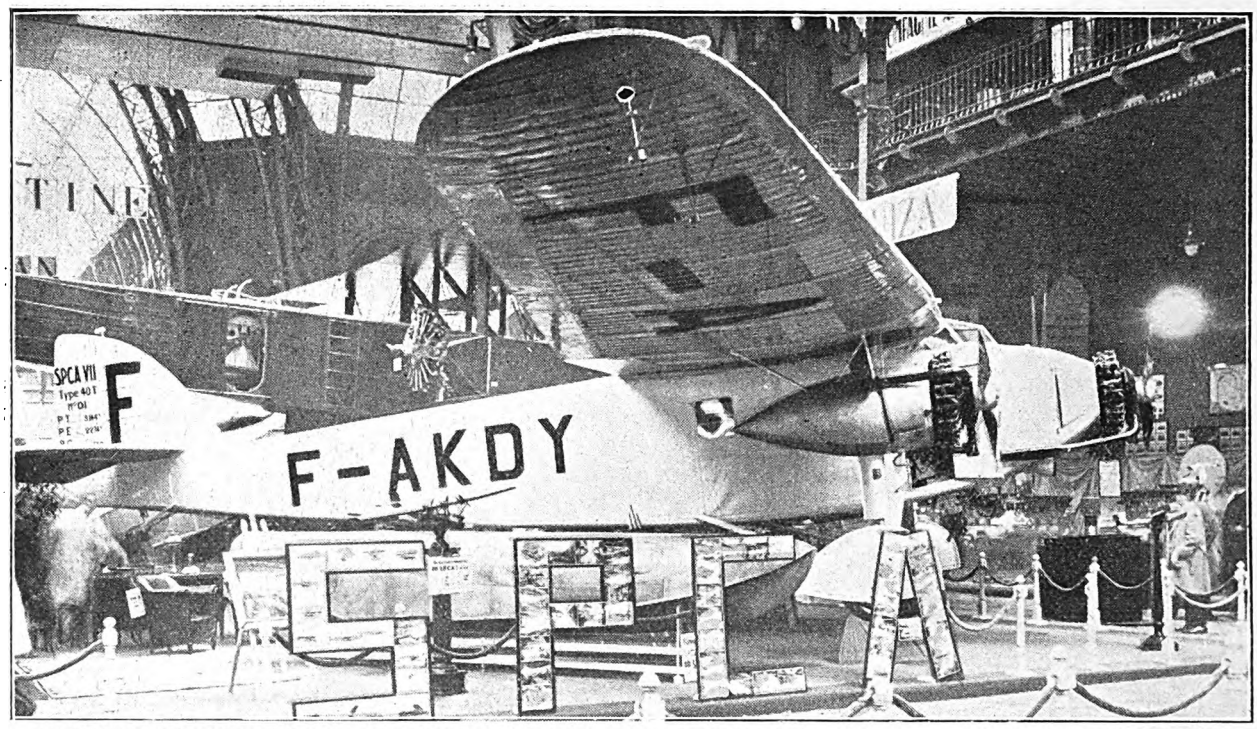



ANOTHER FOKKER TYPE.—The S.P.C.A. tri-motor. The initials of the makers do not stand for the Society for the Prevention of Cruelty to Aeroplanes.

tube Vee and an oleo shock strut. The wheels are retracted or projected by simply pumping the oil out of the messier oleo legs, or *vice versa*.

The range of the F.B.A.310 is 350 km. (200 miles) with three up, 600 km. (370 miles) with two up and 900 km. (560 miles) with one.

The heavy steel plate which armours the hull underneath the path of the propeller is obviously intended to guard it against breakage of the airscrew, but its usefulness is questionable with the heavy steel propeller now used. The wing is generously cut away at the trailing edge to allow passage for the blades.

The petrol is carried in tanks at the bottom of the hull.

The F.B.A. 271 is a veteran of credit and renown. The only difference between the model on show and its older prototype is the addition of a neat cabin over the front where there are places for four including the pilot.

The engine is a 300 h.p. Lorraine mounted high up between the wings, driving a pusher-screw. The inside of the cabin is luxuriously fitted, and a wheel gear is provided outside. There appears to be no provision for shock-absorption, and amphibian qualities are not claimed, so the wheels may be merely a convenience for handling. The yellow finish of the machine is smart and striking.

**S.P.C.A. (Société Provençale de Constructions Aéronautiques). Stand 20.**

This firm shows a metal tri-motor commercial monoplane of distinctly Fokkerish appearance known as the 40.T.

The cantilever wing is built on a central caisson of two interbraced trellis duralumin spars, and the usual ribs with intermittently ribbed metal covering. An extra large corrugation occurs at intervals of two or three feet. The leading and trailing edges are covered with smooth duralumin sheet. The ailerons are in two portions, the inner portions of which are actually only flaps adjustable on the ground.

The fuselage is a metal-covered rectangular girder of duralumin sections and the tail surfaces are also cantilever metal structures.

Three 240 h.p. Salmson engines are used with streamlined exhaust rings in front. The wing mountings are precisely on the Fokker principle, as is also the undercarriage. Large streamlined spats enclose the wheels.

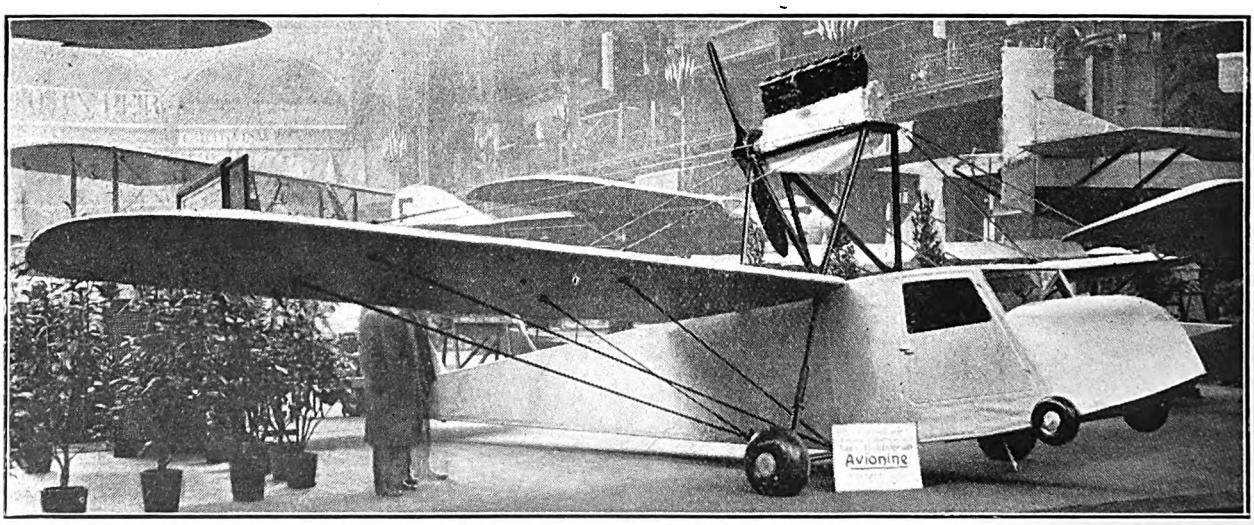
The exhibited specimen is made up as a freighter without passenger accommodation, but mock-ups alongside show the cabin as laid out for eight seats and also as an *avion sanitaire* with bunks for stretcher cases and cabinets for medical equipment.

**WEYMANN-LEPERE (Société des Avions). Stand 19.**

M. Lepère's previous designs were ancestors of which his latest progeny is not worthy. The only aeroplane on this stand has obviously never flown, will probably take off quite successfully, but has little to justify it when it does.

It looks like a monoplane flying-boat with a single six-cylinder in-line air-cooled engine supported above the hull in the Rohrbach-Dornier-Saro manner. It is not, however, a flying-boat of any sort and has four air-wheels on permanent structures to prove it. The engine is at present a dummy and seems like the advance notice of a Renault type at present non-existent.

The fuselage is of steel tube, covered with fabric. In




MORE OR LESS A JOKE.—The Weymann-Lepère aeromobile. A non-technical visitor inspecting this machine remarked that the engine must be very light as the crankcase is made of wood.

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# TITANINE

THE WORLD'S PREMIER

# DOPE

## PARIS SALON

**Nov. 28th — Dec. 14th, 1930.**

AN EXHIBIT WHICH WILL UNDOUBTEDLY ATTRACT GREAT ATTENTION IS THE

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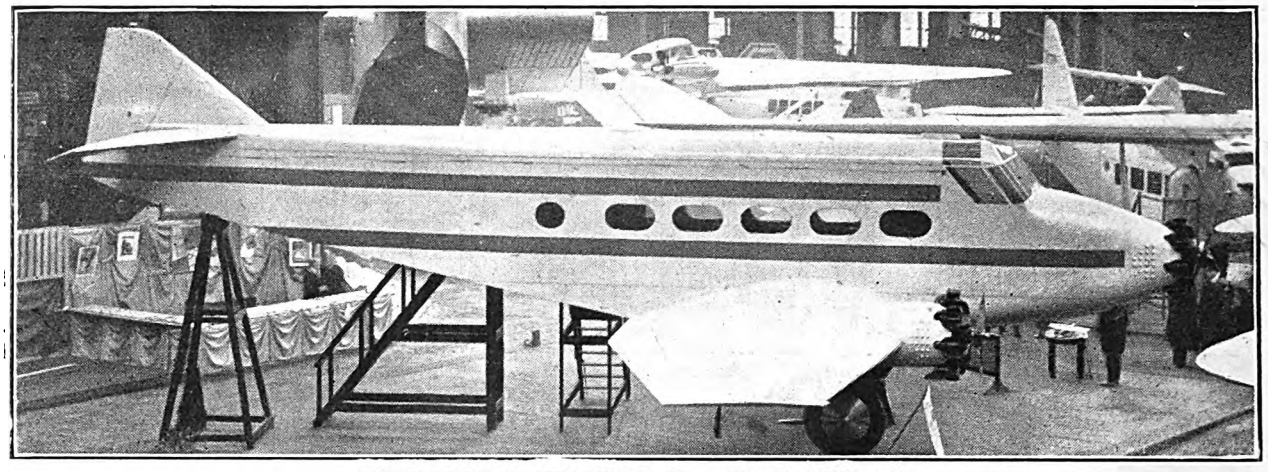

**VERY LIKE A JUNKERS.—The all-metal Wibault.**

the extreme nose is a side-by-side cabin with a large door on each side, a wide rectangular front window, a skylight, one set of controls and a seat exactly similar to that of an ordinary motor-car. The rudder is operated by pedals very similar to clutch and brake pedals, and the careful concealment of everything aeronautical from the notice of passengers leads to the belief that the machine was a deliberate attempt to imitate a motor-car. The size of the aeroplane suggests that its top speed and landing speed alike will be low.

Two Dunlop airwheels are mounted on normal undercarriage members with spiral springs on the shock-struts, and two smaller ones are mounted on rigid axles forward as an anti-capotage device. The height of the engine probably explains this precaution. A tail-wheel is also fitted.

All surfaces, including the wings, are wire braced top and bottom, and the main wings have lift and landing wires supporting them at two points, one nearly half way out along the span and another nearer the tips. They consist of stranded cables bound to the edges of streamlined wooden fairings.

The front of the fuselage is sheet metal and the airscrew is mounted behind the uncowled engine as a pusher.

**WIBAULT (Avions Michel).** **Stand 34.**

M. Wibault shows this year the type 280 T.10 three-engined commercial monoplane which bears a very striking resemblance to the Junkers G.31.

It is a low-wing cantilever monoplane of all-metal construction. The wing is in three sections, the centre section of parallel chord and two outer sections of tapering chord and thickness, with a straight leading edge and all the taper at the back. The wing is built up of two "I" section spars and a number of duralumin ribs. The whole is covered with flat duralumin sheet.

The fuselage is in three sections and is built up of a framework of duralumin angle-metal and "T" sections covered with flat duralumin sheet.

The pilot's cockpit is in front of the leading-edge of the wing and over the wing is the spacious cabin for ten passengers.

The engines are three 300 h.p. Gnôme-Rhône Titan-Majors mounted one in the nose and one on each side of the fuselage where the centre-section ends.

The undercarriage is of the divided type and consists of two Vees one under each engine with axles sloping up to the bottom fuselage longerons. Messier oleo legs and Messier brakes are fitted, and there is a steerable tail-wheel.

The Wibault 280 is as clean as a three-engined commercial monoplane can be and that it should resemble a Junkers type so closely shows that M. Wibault is not too proud to be a copyist. Except for the external outline the machine is a worthy example of M. Wibault's excellent if rather expensive conception of metal construction, a construction that is becoming familiar in England through the acquisition of the licence by Vickers (Aviation) Ltd.

## THE PRESIDENCY OF THE F.A.I.

On Dec. 1 the *Fédération Aéronautique Internationale* elected Prince George Bibesco, a well-to-do Roumanian nobleman, as President, in succession to the late Comte Henri de la Vaulx, who was killed in a flying accident in America about six months ago.

The following were elected members of the Committee:—Herr Gerhard von Hoeppner (Germany), Col. Messner (Switzerland), the Comte d'Oultremont (Belgium), Mr. Godfrey Cabot (U.S.A.), General K. A. B. Amundsen (Sweden), Lt.-Col. Mervyn O'Gorman (Great Britain), Señor Ruiz Ferry (Spain), General Piccio (Italy), and Mynheer van den Bergh van Heemsted (Holland).

M. Louis Blériot (France) was proposed as the tenth member, but his name was not put forward in time and the rules forbade his election on this occasion, so it has therefore been deferred.

The next General Meeting will be held from June 7 to 15, 1931, in Bucharest.

The following facts are very interesting:—

The Royal Aero Club of Holland at a meeting in October unanimously put forward the name of Colonel the Master of Sempill for the Presidency of the F.A.I., "guided by the fact that England is without doubt the country which has shown the greatest interest in sporting and private flying; and, further, that the President now proposed is particularly fitted for the post in that he has had a very wide experience and is, indeed, an outstanding figure in aviation, which would be all to the good for the F.A.I."

Colonel Sempill's name was put forward before he was consulted, but immediately he heard that his name had gone forward he consulted various interests concerned. The greatest pressure was brought to bear on him to accept the nomination, and it was only after long consideration that he declined, on the grounds that it might not be in the best interests of British Aviation if he were elected. If Great Britain supplied the President then the present Vice-President, Lt.-Col. O'Gorman, would have to retire from office, which might make difficulties at the present time in connection with the Schneider Trophy.

If Colonel Sempill's name had gone forward there is every reason to suppose he would have been elected, as a number of countries had definitely agreed to back up the proposal by the Royal Aero Club of Holland.

## THE SCHNEIDER IMBROGLIO.

The great Schneider Imbroglio shows signs of being smoothed out and, though there is no question of cutting the Gordian Knot with any magnificent gesture, unofficial reports suggest that ways are being found whereby all parties stand as they stood,—and yet the matter is settled.

The new arrangements are expected to make possible the acceptance by the Royal Aero Club of the French and Italian entries, while at the same time the Royal Aero Club will be guaranteed against any loss due to organising for a contest for which no entries appear.

## THE SCHNEIDER TROPHY CONTEST.

In the House of Commons on Nov. 26, in reply to a question by Mr. Horrabin, the Under-Secretary of State for Air said that he understood that the International Aeronautical Federation was holding a meeting early in December to discuss certain outstanding questions with regard to next year's Schneider Trophy race. Arrangements had been made, provisionally, for a meeting after this date between the Air Ministry and the Royal Aero Club.

## THE AKROYD STUART MEMORIAL PRIZE.

The first Akroyd Stuart Memorial Prize and Lecture has been awarded, on the report of the referees, Professor A. H. Gibson, Professor Dalby, and Wing Cdr. T. R. Cave-Browne-Cave, to Mr. D. R. Pye, M.A., F.R.Ae.S., for his paper entitled "The Origin and Development of Heavy Oil Aero Engines."

The prize paper will be delivered before the Society in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m. on Thursday, Dec. 11.

All those who have heard Mr. Pye speak at similar gatherings will look forward to this lecture with pleasurable anticipation, and those who have not heard him are advised to do so. He is a highly technical man who is intensely practical in his outlook, and a serious thinker with an exquisite sense of humour, so at his worst he is more entertaining and instructive than are most people at their best.

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# A REMARKABLE TEST

## *100 hours at 2,000 r.p.m. on Stanavo Aviation Oil!*

A Standard Cirrus Hermes Mark II engine has successfully completed an 100 hours Air Ministry Type test under official observation.

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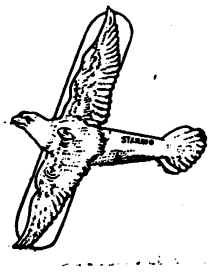


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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, November 25.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Plt. Off. on probation G. F. Humphries is confirmed in rank (May 1). The following Plt. Offs. are promoted to the rank of Flg. Off.:—G. D. Hoyland (July 8); H. R. Black, G. D. Fleming, H. V. L'Amy, F. Lemon, H. L. Messiter, G. W. Phillips, M. V. Ridgeway, A. E. Smith, E. A. H. Tanner (Oct. 14).

Lt.-Cdr. A. P. Colthurst, R.N., Flt. Lt., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Nov. 11).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Plt. Off. on probation K. R. Boulton is confirmed in rank (Nov. 6).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—G. C. Gould (Oct. 3); R. F. Bulstrode (Oct. 5); L. F. Stanley (Oct. 8); J. A. Ingles (Oct. 9); W. R. P. K. Mason (Oct. 9); S. H. R. Clarke (Oct. 11); P. C. Hordern (Oct. 15); E. A. M. Norie (Oct. 15); H. R. A. Edwards (Oct. 15); H. Garnett (Oct. 16); G. P. Jewett (Oct. 19); F. M. Walker (Oct. 20); T. H. Bevan (Oct. 23); J. E. Walker (Nov. 6).

The following Flg. Offs. relinquish their comns. on completion of service:—H. V. Michell (Sept. 2); I. Glyn-Roberts (Sept. 22); H. S. Fulton (Oct. 7).

The following Flt. Lts. relinquish their comns. on completion of service and are permitted to retain their rank (Oct. 24):—W. S. Watson, J. C. Atkinson.

STORES BRANCH.—Flt. Lt. E. P. Terry relinquishes his comn. on completion of service and is permitted to retain his rank (Nov. 11).

## Appointments.

*Week ending Dec. 2.*

GENERAL DUTIES BRANCH.—Wing Commander J. O. Archer, C.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Establishment, 1/11.

Squadron Leader T. C. Luke, M.C., to No. 7 Sqdn., Worthy Down, 20/11.

Flight Lieutenants F. L. Hopps, A.F.C., to R.A.F. Base, Singapore, 22/11. F. W. W. Wilson, to No. 70 Sqdn., Hinaidi, 27/10. E. A. McKinley-Hay, to No. 11 Sqdn., India, 22/11. G. H. Loughnan, to No. 20 Sqdn., India, 22/11. L. M. Hilton, D.F.C., A.F.C., to No. 41 Sqdn., Ruislip, 17/11. S. A. Turner, M.B.E., to H.Q., Inland Area, Stanmore, 20/11. R. J. H. Holland, to No. 1 F.T.S., Netheravon, 24/11. S. H. Woolf, to R.A.F. Depot, Uxbridge, on appointment to a s.s. comn., 19/11. E. C. Dearth, to R.A.F. Depot, Uxbridge, 17/11. G. G. Mobsby, to R.A.F. College, Cranwell, 7/11.

Flying Officers D. J. R. Hylton, to A. and G. School, Eastchurch, 13/11.

Pilot Officers E. G. B. Kiddle, to No. 3 F.T.S., Grantham, 19/11. J. C. Larking, to No. 12 Sqdn., Andover, on appointment to a s.s. comn., as Plt. Off. (on probation), 17/11. E. C. Smith-Ross, to No. 2 A.C. Co., Palestine, 3/11.

MEDICAL BRANCH.—Wing Commander D'A. Power, M.C., to H.Q., R.A.F., Mediterranean, 15/11.

Flight Lieutenants W. E. Barnes, to R.A.F. Depot, Uxbridge, 1/12. J. Magner, to No. 1 (Indian Wing) Station, Kohat, 20/10.

Flying Officers M. T. O'Reilly, to H.Q., 'Iraq Command, 21/11. H. T. Rylance, to A.A.E.E., Martlesham, on appointment to a temp. com., 19/11.

STORES BRANCH.—Wing Commander B. W. M. Williams, to Aircraft Depot, 'Iraq, 21/11. For Stores duties.

Flight Lieutenant R. T. Rich, to Station H.Q., Hornchurch, 1/12.

Flying Officers A. E. Connolly, to No. 216 Sqdn., Heliopolis, 3/11. G. Blinman, to No. 84 Sqdn., 'Iraq, 7/10.

ACCOUNTANT BRANCH.—Wing Commander P. J. Wiseman, to H.Q., R.A.F., Cranwell, 21/11.

Flight Lieutenant C. E. Aston, to R.A.F. Base, Calshot, 26/11.

DENTAL BRANCH.—Flight Lieutenant W. D. Guyler, to No. 10 Group H.Q., Lee-on-Solent, 18/11.

CHAPLAINS' BRANCH.—The Revd. G. A. Davies, B.A., to No. 203 Sqdn., Basrah, 7/10.

## Fatal Accidents.

The Air Ministry regrets to announce that as the result of a collision in the air near Leuchars, Fifeshire, between two Hawker Horsley aircraft of No. 100 (Bomber) Squadron, Donibristle, on Nov. 25, Flt. Lt. Alexander Harold James Howlett and Flt. Lt. Gerald Brooks, the pilots and sole occupants of the aircraft, were killed.

The Air Ministry regrets to announce that as the result of an accident at Pinner Park, Middlesex, to an Avro Aircraft of the Home Aircraft Depot, Henlow Camp, on Nov. 30, Flt. Lt. Douglas Wells Gibbon, the pilot and sole occupant of the aircraft, was killed.

## The High Command.

The Air Ministry announces the following appointments:

Air Commodore Charles Stuart Burnett, C.B., C.B.E., D.S.O., now Chief Staff Officer, 'Iraq Command, to be Director of Operations and Intelligence, Air Ministry, and Deputy Chief of the Air Staff, with effect from Jan. 31, 1931, vice Air Vice-Marshal Cyril Louis Norton Newall, C.B., C.M.G., C.B.E., A.M., on the latter assuming command of Wessex Bombing Area, Royal Air Force.

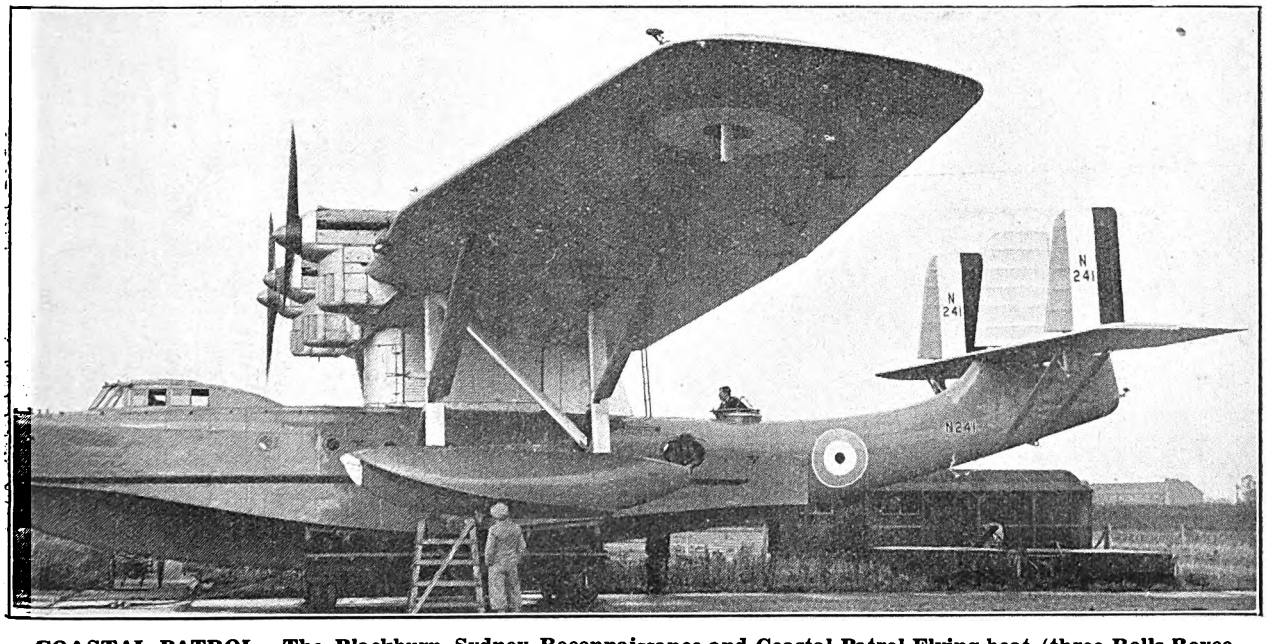
Air Commodore Wilfrid Rhodes Freeman, D.S.O., M.C., to Command Headquarters, Transjordan and Palestine, with effect from Dec. 6, 1930, vice Air Commodore Patrick Henry Lyon Playfair, M.C., on the latter completing his period of appointment.

Group Captain Christopher Lloyd Courtney, C.B.E., D.S.O., now Deputy-Director of Operations and Intelligence, Air Ministry, to be Chief Staff Officer, 'Iraq Command, with effect from Jan. 7, 1931.

A biographical note on the career of Air Commodore Burnett appeared in THE AEROPLANE of Feb. 12, 1929; of Air Commodore Freeman, in THE AEROPLANE of Nov. 14, 1928, and of Group Captain Courtney in THE AEROPLANE of Jan. 30, 1929.

## Royal Air Force Flying Accidents.

In the House of Commons on Nov. 26, in reply to a question by Lieut.-Col. Heneage, the Under-Secretary of State for Air said that the number of deaths due to flying accidents in the R.A.F. this year was 62. He regretted that this was an increase over last year's figure, but it was practically the average for the same period in the five preceding years, when much less flying had been done. The important point in considering this question was the proportion of fatal accidents to the amount of flying done. For




**COASTAL PATROL.—The Blackburn Sydney Reconnaissance and Coastal Patrol Flying-boat (three Rolls-Royce F. XII M.S. engines) at Brough. She was put through her final tests by Sq. Ldr. Rea on Nov. 28 and handed over to the R.A.F.** —(*"Aeroplane" photograph.*)

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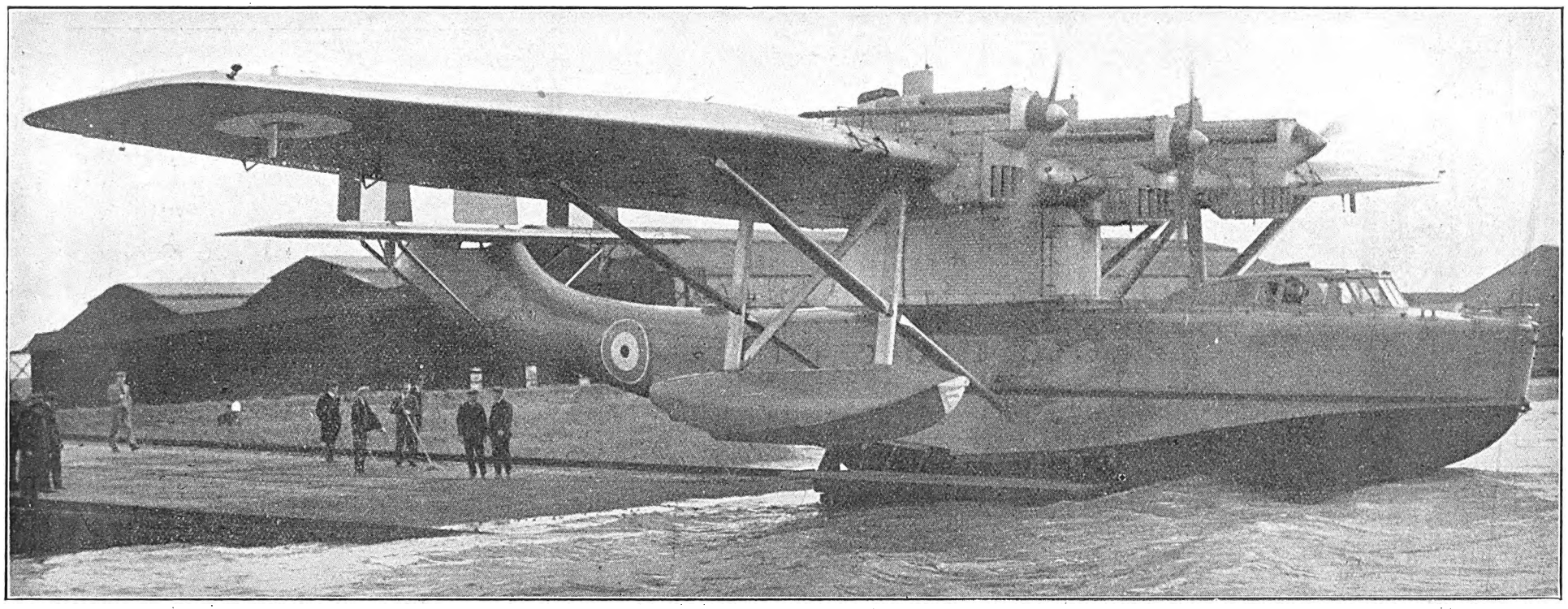

**AFLOAT.—The Blackburn Sydney (three Rolls-Royce F. XII M.S. engines) after leaving the slipway at Brough for her trials. Although handed over to the R.A.F. on Nov. 30 she had to return to Brough because the visibility between Brough and Felixstowe was only about 100 yards.**—(*"Aeroplane" photograph.*)

the period January to October 1930 this proportion, although not so low as in 1929, was considerably lower than for any of the years from 1921 onwards. A downward movement had thus been maintained, though not at a uniform rate. Of the 62 persons killed this year 35 had been on aircraft not fitted with slots, or with slots not in operation, while 54 had been supplied with parachutes. As regards safety devices, constant attention was given to the whole subject of the best means of improving the safety of flying and to the development of any devices that would do this. As a result, there had been a progressive increase in the safety of flying in the R.A.F.

Replying to a further question by Lieut.-Col. Heneage, Mr. Montague said that it was necessary for some amount of flying practice to be undertaken in machines not fitted with slots, and although there were accidents to machines with slots, they were not by any means because of the slots.

**Service Parachute Escapes.**

The following figures give the number of lives saved by parachutes in the Royal Air Force since they were introduced in 1926. In each case the Service machine from which the crew escaped by parachute was wrecked:—1926, 4; 1927, 3; 1928, 6; 1929, 18; 1930, 20.

The date of the first R.A.F. parachute escape after the order was June 17, 1926.

[This paragraph affects the foregoing paragraphs. The fair assumption is that without parachutes there would have been 20 more deaths in flying accidents during this year. Thus the increase of deaths would have been in proportion to the decrease in flying.—Ed.]

**Officers' Pay.**

In the House of Commons on Nov. 26, in reply to a question by Mr. W. G. Hall, the Under-Secretary of State for Air said that no airmen cadets and officers promoted therefrom were drawing less pay per annum than cadet entry officers who were junior to them as a result of the revised pay regulations.

**The Air Exercises, 1930.**

The Air Ministry has decided that no report for publication will be issued on the Air Exercises of 1930. The lessons learned from them are still under consideration, and any conclusions reached will be technical and of little interest to the public.

Certain figures relating to flying hours have, however, been issued and are a tribute to the efficiency of the commands concerned. They are as follows:—

Total flying hours 2,980, Red Colony 1,408½, Blue Colony 1,571½.

Average hours flown per squadron 120, Red Colony 108, Blue Colony 131.

*Type Analysis.* (Average hours per squadron): Night Bomber Squadrons 130, Day Bomber Regular Squadrons 140, Day Bomber Auxiliary Squadrons 145, Fighter Squadrons 100. The higher average figure shown for Auxiliary Squadrons is explained by their employment of slower types of aircraft.

**Boscombe Down Station.**

No. 9 (Bomber) Squadron, R.A.F., has moved from Manston to Boscombe Down, Wiltshi. No. 9 Squadron is equipped with Vickers Virginias and is commanded by Wing Cdr. W. V. Strugnell, M.C.

Boscombe Down is a War-time station of the R.F.C. and R.A.F., near Amesbury. It has recently been re-opened under the command of Wing Cdr. W. R. Read, M.C., D.F.C., A.F.C. In addition to the Station Headquarters and No. 9 Squadron, another Bomber Squadron, probably No. 10 Squadron from Upper Heyford, will be moved there.

The address of the new Station is Boscombe Down, Salisbury, Wilts., the telegraph address Aeronautics, Amesbury, and the telephone number Amesbury 121.

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### The West African Flight.

The West African Flight, R.A.F., arrived at Khartum on Nov. 25 at 13.45 hours, local time, on the completion of a Service routine flight to Bathurst and back.

### The Esher Trophy.

The Esher Trophy which was presented five years ago by Lord Esher for competition among the Squadrons of the Auxiliary Air Force was presented to No. 605 (County of Warwick) (Bomber) Squadron, A.A.F., by Air Chief Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O., Chief of the Air Staff, at the R.A.F. Station, Castle Bromwich, on Nov. 29.

The Esher Trophy is awarded annually to the Squadron of the Auxiliary Air Force the markings of which are highest for a large range of subjects including navigation, wireless telegraphy, airmanship, photography, and flying efficiency.

The Trophy was won in 1926 by No. 601 (County of London) (Bomber) Squadron, in 1927 by No. 605 (County of Warwick) (Bomber) Squadron, in 1928 by No. 601 (County of London) (Bomber) Squadron, and in 1929 by No. 602 (City of Glasgow) (Bomber) Squadron.

### Service Instruction to Foreign Officers.

In the House of Commons on Nov. 26, in reply to a question by Sir N. Grattan-Doyle, the Under-Secretary of State for Air said that in the great majority of cases foreign officers came for instruction with the R.A.F. because of the special facilities available in this country and for that reason the question of reciprocal action did not arise. In any event foreign officers were normally charged a substantial fee in respect of their training.

### A Desert Rescue.

A Royal Air Force troop-carrier flew from Baghdad with a doctor on Nov. 25 to the desert 50 miles west of Rutba, where an accident had happened to the Overland Mail, and took Captain Moore, of the 'Iraq Army, and his wife, who had been injured in the accident, to hospital in Baghdad.

### Another Member for Air.

Flt. Lt. the Marquess of Douglas and Clydesdale, No. 602 (City of Glasgow) (Bomber) Squadron, Auxiliary Air Force, was, on Nov. 29, elected to represent East Renfrew, Scotland, in the House of Commons.

As an officer of the Auxiliary Air Force and the owner of a light aeroplane, Lord Clydesdale will be a welcome addition to the ranks of those who support the Royal Air Force and Civil Aviation at Westminster.

### Long Service and Good Conduct.

Long Service and Good Conduct Medals have been awarded to the following airmen with effect from the dates mentioned:—

130 S.M.1 Bell, A. E. (1.7.30); 348 S.M.1 Bethell, H. E. (10.9.30); 314142 S.M.1 Casey, V. J. (11.10.30); 181 S.M.1 Chambers, I. F. (15.7.30); 220 S.M.1 Cummins, H. H. (22.7.30); 385 S.M.1 Downer, M. (23.9.30); 318 S.M.1 Dusting, J. E. (23.8.30); 159 S.M.1 Jarvis, C. E. (9.7.30); 315042 S.M.1 Moore, A. F. (12.8.30); 129653 S.M.1 Nightingirl, F. (16.9.30); 406 S.M.1 Pearce, R. L. (3.10.30); 364 S.M.1 Thornton, G. (16.9.30); 349 S.M.1 Whenman, F. C. (10.9.30); 339 S.M.1 Willis, F. J. A. (3.9.30); 289 S.M.2 Collett, A. V. (12.8.30); 318269 S.M.2 Harding, T. H. (31.5.30); 123 S.M.2 Lee, P. N. (2.7.30); 371 S.M.2 Nash, R. H. (20.9.30); 314819 S.M.2 Oland, H. A. C. (13.9.30); 200701 S.M.2 Punter, V. E. (9.8.30); 313303 S.M.2 Woollard, J. R. (28.8.30); 114548 F-S. Crowder, T. (14.8.30); 313718 F-S. Ffoulkes, H. G. (12.7.30); 314217 F-S. Gurowich, R. O. (17.6.30); 106 F-S. Langfield, G. J. (18.6.30); 843 Sjt. Welch, J. (12.10.29); 200674 L-AC. Whitaker, S. H. (24.6.30).

### Enlistments.

In the House of Commons on Nov. 26, in reply to a question by Mr. Bowen, the Under-Secretary of State for Air gave the following table of numbers of men who had offered themselves for enlistment during the periods in question:—

Week ended May 10, 1929, 218; week ended May 17, 345; week ended May 24, 203; week ended May 31, 252; week ended Nov. 8, 553; week ended Nov. 15, 476; week ended Nov. 22, 282; week ended Nov. 29, 375.

### A Memorial to Old Etonians.

On Saturday, Dec. 6, at 13.00 hours, Air Chief Marshal Sir John Salmond, Chief of the Air Staff, will unveil a memorial to seventy-four Old Etonians who lost their lives whilst serving with the Royal Flying Corps, the Royal Naval Air Service and the Royal Air Force, during the War 1914-18.

The memorial, which consists of an alabaster tablet on which the names are inscribed under the Service crests, has been erected in Eton College Cloisters directly under Lupton's Tower.

The ceremony will be of a very simple nature. Relatives and Old Etonians who are interested are invited to attend.

### The Comrades of the Royal Air Force.

The following letter has been received from Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., R.A.F. (retired), Chairman of the Comrades of the Royal Air Forces:—

Without encroaching too much upon your valuable space, might I be allowed to briefly touch upon the aims and objects of this new post-war organisation.

Primarily, the "Comrades of the Royal Air Forces" was brought into being, after much considered discussion by my Committee. Twelve years had been allowed to pass from the cessation of hostilities with no apparent effort having been made to hold together the Officers and Men who served in His Majesty's Air Forces. It must therefore be agreed that the time had arrived for the establishment of such a movement, as with each successive year the difficulty of making connection would become more pronounced.

Our aim is to link together again those who served the Empire in any branch of the Crown Air Forces, to encourage and promote social gatherings amongst our members, and to render service to each other. The Association is free from any charitable motive; in view of the fact that so many organisations of this type abound these days and it was not desired to add still one more to the list.

Membership is strictly reserved to Officers and Men, past and present, of the Royal Naval Air Service, Royal Flying Corps, Royal Air Force and the Dominion and Colonial Air Forces.

The organisation will consist of Headquarters, a Central Branch and Provincial Branches. These latter will be formed throughout Great Britain and the Dominions, as and when application is received at Headquarters. Branches are already opening in many of the main towns, and are meeting with strong support from the local residents.

Annual subscription to the Association is a small sum, of which four-fifths is allocated for Branch maintenance. There is no retinue of salaried officials to maintain from the funds and the control of the Association is vested in a strong representative Central Committee—most of whom served the Country during the War 1914-1918 in active aerial operations.

Might I be allowed, through your columns, to bring this association to the notice of all ex-Officers and men and to appeal for their support to our undertakings.

All correspondence should be addressed to the Secretary, "Comrades of the Royal Air Forces," The Queen's Hotel, Leicester Square, London, W.C.2, *and not to the Air Ministry.*

## R.A.F. SPORTS.

### Inter-Unit Rugger Cup.

The results of the preliminary round of the R.A.F. Inter-Unit Rugby Football Cup Competition are as follows:—Felixstowe beat Martlesham by 10 points to 4; North Weald beat Hornchurch by 9 points to 3; Uxbridge beat Ruislip by 6 points to 5; No. 9 Squadron beat Northolt by 8 points to nil; Worthy Down beat Tangmere by 16 points to 3.

### Boxing.

The following on R.A.F. Boxing has been received:—

The R.A.F. Officers' team met Cambridge University in a very interesting match on Nov. 21. Unfortunately our side was only a moderate one owing to injuries which, strange as it may seem, were all due to Rugger and not to the Noble Art. We managed to turn out a side eleven strong, the majority of which could only be classed as novices. The comparison of fitness between the two sides was very marked, as in practically every instance our officers won the first round and then failed by being out of condition. Among the new-comers to the side Plt. Offs. Littler, Heggate, and Nixon did very well indeed. Noblston was giving away weight to Obeyseker, and Davies, who is nominally a light-heavy, gave away nearly two stone to the Cambridge captain and a great deal in height and reach. His performance was very creditable and he lost by a very small margin. The most surprised boxer of the evening was Flg. Off. MacLean who, after having hit his man from all angles from the first to the last gong, saw the M.C. proceed to the Referee for a casting vote. The Referee promptly awarded MacLean the verdict. The R.A.F. won four bouts and lost seven. The next officers' match is against Belsize on Dec. 19, at Manston.

After the Cambridge match AC. W. Munkley and Sjt. Harper were billed to box six rounds each with Signalman Stuart, the Army and England Heavy-weight Champion, and A.B. Warnes, R.N., the I.S.B.A. and Navy Champion, respectively. Sjt. Harper lost to Warnes after a great battle, but Stuart failed to appear and a very good substitute was found in Cpl. O'Grady, the Guards' Champion. Munkley proved too good for O'Grady, but the bout provided some exhilarating fighting. Munkley is undoubtedly the best man the R.A.F. have ever turned out. He is purely an Air Force product and has learned all his boxing in the Service. He has been unlucky in being kept out of the A.B.A. championships for two seasons by injuries.

The R.A.F. Boxing Association are taking part in an important match in Birmingham on Dec. 5 against the Irish Civic Guard. They will be represented by Flg. Off. MacLean, AC. Munkley, AC. Clapp, and Sjt. Harper.

The first match of the season for Airmen will take place at Chelsea on Dec. 11 against the Brigade of Guards.

Officers in charge of Boxing overseas who have any likely men who are being posted home this season are asked to write to Sq. Ldr. A. E. Pettingell, Hon. Secretary, R.A.F. Boxing Association, Henlow Camp, Bedfordshire.

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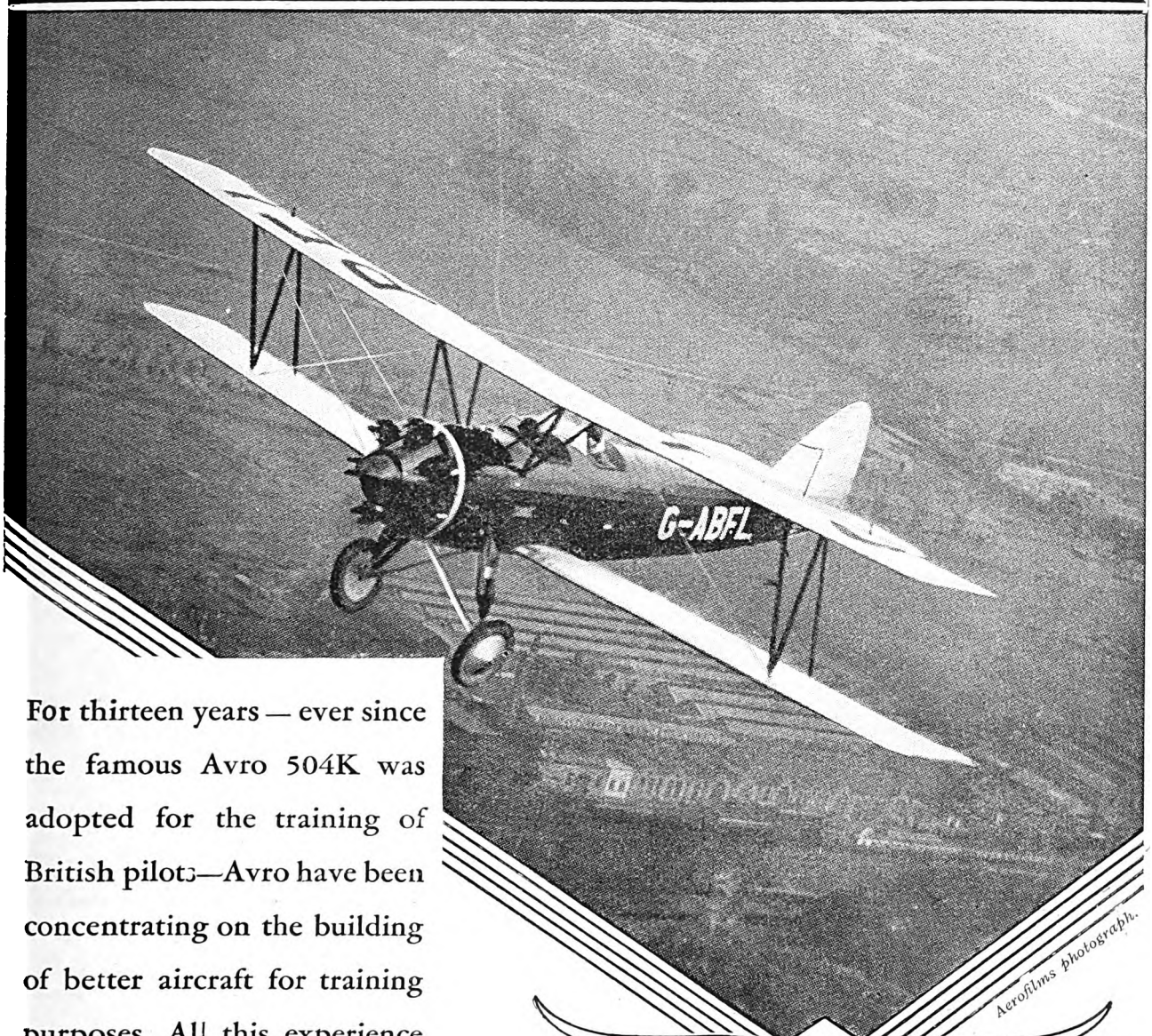


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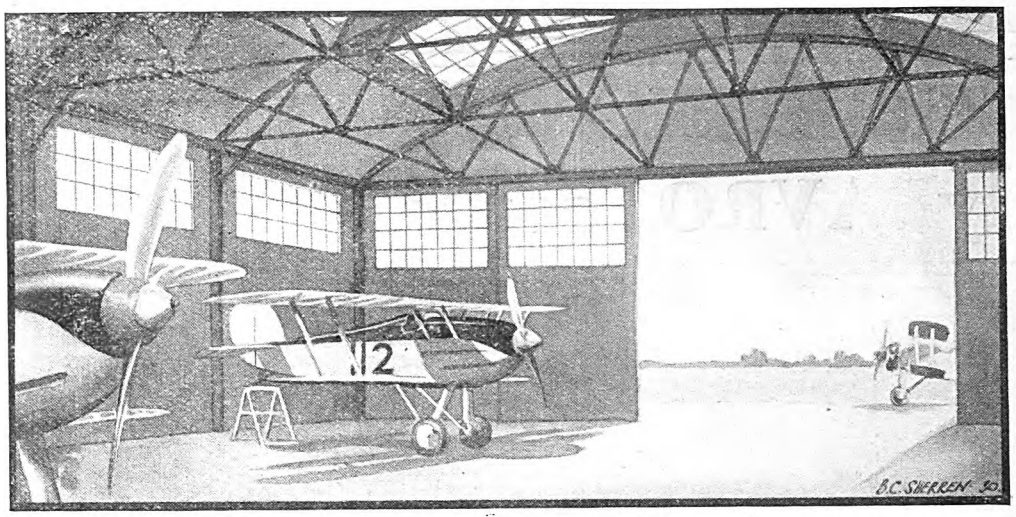


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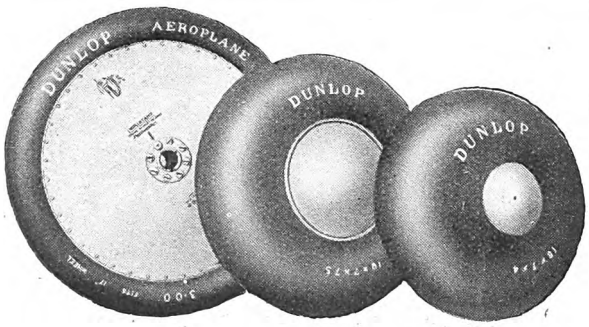


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# COMMERCIAL AERONAUTICS.

## ANOTHER CHANCE.

Now that British aeroplanes are fast becoming one of the country's most important exports, one is a little surprised to learn the following from the Teheran Correspondent of *The Times*:—

The Persian Government, which invited various foreign countries to enter aeroplanes for a competition to be held at the end of October, 1930, with the intention of making purchases for the Persian Army, announces that, as only two competitors arrived, representing France and Soviet Russia, the competition will be held again in the Spring of 1931, when other countries are expected to take part.

This looks like a chance for the British Industry if it can turn half an eye away from Buenos Aires. Persia can pay for what she buys, and if the price is put high enough at the start to allow for intermediate commissions there is no reason why a profitable trade should not be done.

## THE NORTH ATLANTIC AIR MAIL.

The beginning of an attempt to link the New and Old Worlds with an air mail is announced in a statement from New York by *The Times* correspondent on Nov. 30. That, as suggested by the air correspondents in other papers, Imperial Airways will be interested seems unlikely when one reads the paragraph which states that "at least 75 per cent. of the stock must be vested in citizens of the United States, etc."

According to *The Times*, the United States Post Office on Nov. 29 invited tenders for a contract for an air mail service between the United States and Europe. The tenders will be opened on Dec. 29.

The route is to be from New York by way of Norfolk, Virginia, or Charleston, South Carolina, to Hamilton, Bermuda, and thence by way of the Azores to a point in Europe to be specified later by the Postmaster-General. The contract is to run for ten years, starting on June 1 next year.

The contractor is not to receive payment for the flights between the United States and Bermuda until he has established the service over the remainder of the route. The establishment of the service from Bermuda to Europe, however, is not required of the contractor until July 1932. Should this turn out to be impossible, new arrangements will be made regarding the United States to Bermuda section of the route.

Bidders and contractors must be citizens of the United States and no corporation which is not organised under the laws of the United States will be eligible to bid. Its president and managing directors must be citizens of the United States, and "the title to at least 75 per cent. of its stock must be vested in citizens of the United States, free from any trust or fiduciary obligation in favour of any person or persons not citizens of the United States, and must be free from control, by any means whatsoever, by any person or persons not citizens of the United States or by any corporation controlled" by non-American citizens.

## ACTIVITIES OF N.F.S.

During the past year National Flying Services Ltd. have located 107 landing grounds which the firm hope will be made available in the near future for use by private aircraft and the N.F.S. air-taxis.

Sir Alan Cobham says that these grounds help to fill in the gaps between recognised aerodromes and will greatly increase the convenience and safety of flying. They have been approved by the Air Ministry and, if required, may be licensed for use as flying develops.

Many of the sites were first discovered by "joy-ride" firms, whose pioneer work is now being turned to good account in the development of air transport. A number of the sites may be reserved for development as fully equipped aerodromes.

These grounds are not, however, intended as sites for future municipal airports. A considerable number of towns are now having a thorough search of their surroundings made by specialists, who by a process of elimination arrive at the best position for the air harbour of the future.

Eight towns have municipal airports already working, namely:—Blackpool, Bristol, Hull, Ipswich, Liverpool, Manchester, Nottingham and Plymouth.

The following landing grounds have been inspected by National Flying Services, Ltd.:—

Aberdeen, Ayr, Aylesbury.

Broadstairs, Bournemouth, Basingstoke, Barrow-in-Furness, Bath, Bedford, Burton-on-Trent, Belfast, Bangor, Bradford, Brighton, Berwick-on-Tweed, Bridlington, Beverley, Bognor Regis, Bury St. Edmunds, Bideford.

Chester, Cambridge, Coventry. Carlisle, Clacton-on-Sea, Colchester, Cirencester, Crewe, Chelmsford, Canterbury, Cardiff, Chatham.

Dorchester, Dunstable, Dunfermline, Dundee, Durham, Darlington. Dover, Dumfries, Douglas, Isle of Man.

Enfield, Eastbourne

Folkestone, Filey, Felixstowe.

Gillingham, Grimsby, Great Yarmouth.

Hereford, Harrogate, Hull, Harwich, Hitchin, Huntingdon, Herne Bay.

Inverness.

Kelso.

Ludlow, Luton, Loughborough, Llandudno, Lancaster, Lanark, Lincoln, Lowerstoft, Louth.

Mansfield, Morecambe, Minehead, Maidstone. Middlesborough, Margate, Maidenhead.

Newport Pagnell

Oxford

Peterborough, Perth, Portsmouth.

Romford, Ramsgate, Rochester, Ripon, Rhyl.

Salisbury, Swanage, Swansea, Sheffield, Southport, Stockton-on-Tees, Sunderland, Stirling, Stranraer, Scarborough, Skegness, Spalding.

Taunton, Tewkesbury.

Worcester, Warrington, Walsall, Windsor, Wolverhampton, Weymouth, Winchester, Worthing.

York, Yeovil.

## COLONEL SEMPILL AT BIRMINGHAM.

Colonel the Master of Sempill was the principal guest at the annual dinner of the Midland Branch of the Institution of Mechanical Engineers in Birmingham recently.

Replying to the toast of "The Guests and Kindred Societies," Colonel Sempill said that Birmingham was the most recent of the large towns in the Kingdom to acquire an aerodrome. An aerodrome would be as necessary in the future as a railway station was to-day. The mileage of air routes was increasing all over the World each year and aviation was beginning to pay for itself. He also took the opportunity of paying a tribute to Dr. Lanchester, a Birmingham resident for thirty years or more, who had first expounded the fundamental theory of aero-dynamics.

## MRS. KEITH MILLER.

The following story appeared in *The Times* on Nov. 30:—

Aeroplanes yesterday and to-day continued a search for Mrs. Keith Miller, who has been missing since 9.11 a.m., on Friday, when she started from Havana for Miami, alone in an old, ramshackle monoplane called the Bullet. She was on her way back to Pittsburgh, hoping to increase her reputation as a commercial pilot by flying from Pittsburgh to Havana and back in what she herself described as "a rotten unairworthy crate."

More than a year ago two test pilots were killed in the machine, which got the reputation of being a machine with a curse on it. When she bought it it was already regarded as derelict. She had it repainted and renamed, and borrowed a motor for it. On her present flight she had neither wireless nor any facilities for blind flying. She said it rocked so that she dare not take her hands from the controls.

When Mrs. Miller left Havana she already had a premonition of disaster. Ever since she crossed over from Florida, she said, "Something has been telling me I am going down, and somehow or other I can't shake it off."

Captain W. N. Lancaster, a friend of Mrs. Miller, who refuses to believe that she is dead, is on his way to Havana to join in the search.

One does not for a moment credit *The Times* correspondent with publishing this story as a fact on which he pledges his reputation. It is quite obviously a compound of bits and pieces which he has gathered from various American sources of news, and the ordinary American news agency is more inaccurate and more idiotic than even our own in this country, unbelievable though the idea may seem. If the story were true Mrs. Miller would obviously be a fool, which her career as a pilot definitely proves she is not. She is a very daring pilot, but a very competent one.

In 1926 she flew to Australia in an Avro with Captain Lancaster, and, although they crashed badly in the Dutch East Indies, and had to take the machine back to Singapore to be repaired, they finished the journey and thus she became the first woman to fly to Australia.

Thereafter she went to the States and is recognised there as being one of the finest female pilots in the World. She has flown consistently well, and deserves full credit for upholding the reputation of British women as aviators. Also she has been doing good work for this country because she has been one of the chief sales-agents for Cirrus Engines.

The newspaper story quoted above is probably based on the fact that on Nov. 16 she flew from New York to Los Angeles in 25 hrs. 45 mins., and on Nov. 26 she flew back from Los Angeles to New York in 21 hr. 47 mins., and set

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up two trans-Continental records for women pilots on a machine called the Alexander Eaglerock Bullet.

This is a low wing monoplane and has the reputation in the States of being difficult to fly, in that it spins on the slightest provocation. But it is undoubtedly extraordinarily fast as these records show.

Quite possibly a few inexperienced people who called themselves test pilots may have been killed in machines of the same type. But there is little probability that the same machine would be worth rebuilding after killing two different pilots.

Mrs. Miller may have acquired another machine of the same type which had been lying unused for some time, much as an Australian aviator bought the Tiger Moth which had been hanging in the roof of the De Havilland factory for a year or two after putting up its extraordinary record of over 190 m.p.h. several years before.

Any ignorant person knowing the speed of the Tiger Moth might easily say much the same things about the person who bought it as are credited to Mrs. Miller, and quite possibly she herself described the machine as "a rotten unairworthy crate" merely quoting ironically what other people said about it.

On Dec. 1 all sorts of stories came across the Atlantic about the re-discovery of Mrs. Miller. One was that she had made a forced landing on Friday, Nov. 28, on "the small and lonely island of Andros, one of the Bahama Islands." This would be some hundreds of miles off her course. And as a matter of fact Andros is very much the biggest of the Bahama Islands and is something like 150 miles long, so that the story is typically journalese.

Another story was that she had been picked up by a fishing boat while floating on an emergency raft which she carried in her machine. And if she carried a raft she was evidently not taking any crazy risks. Lots of good pilots are less careful.

Another message says that Mrs. Miller has now reached Nassau, the capital of the Bahamas. Assuming that this last statement at any rate is true, the assumption is that after starting from Havana she hit a very strong westerly gale and was drifted a long way off her course, and did in fact land on Andros, which she might very well have reached with comparatively little side-drift in such a fast machine as the Eaglerock Bullet. Consequently, what looks like a story of sheer idiocy boils down to a statement of a rather good performance.

**MANY INVENTIONS (Dec. 1).**

Mr. Handley Page was iconoclastically inclined, it seems, when he named his new aeroplane *Hannibal* instead of *Hannah*, for by doing so he has destroyed our cherished tradition that all aeroplanes are feminine and are to be referred to as such especially when they behave inconsequently, illogically and irritatingly on the tarmac. Perhaps he thinks there will be nothing girlish about Hannibal; and this aeroplane, which recently made its first flights at Radlett, certainly seems to have more of the ponderous dignity of the male than the vivacity of the other gender.

As the Handley Page bulletin remarks, "Many novel features have been incorporated in the design," but it is left to us to reveal several innovations hitherto undreamed of by mortal man, not excluding Mr. Handley Page himself. For example,—owing to the distance between the pilot and the tail-wheel a tell-tale chart may possibly be installed in the cockpit which will give off a thick yellow smoke if the tail wheel becomes inextricably wedged between two boulders, thus preventing the pilot taxying merrily ahead in such circumstances. No doubt Hannibal stretches fairly easily, within reason, but it cannot be good for him, for he is quite long-waisted as it is.

Another feature, we will not go so far as to say it has been actually decided upon at present, is a travelling floorway by which passengers can be conveyed from the front door (at the back) to the front row of the stalls. Otherwise, so lengthy is Hannibal and so phenomenonally fast in flight is he rumoured to be, that passengers with front seats would scarcely reach them by ordinary pedestrian methods before the machine landed at Paris.

Hannibal's amazing turn of speed is believed to be due to the cunningly contrived corrugated fuselage, down the grooves of which an ordinary 10 m.p.h. wind can be made to move at 40 m.p.h. attracted by a number of whistles set near the tail. Thus the ancient nautical legend of whistling for a wind (and getting a gale) has been gloriously applied to modern science.

It is understood that an outburst of alarm and despondency among those whose job it will be to look after the top pair of engines of Hannibal has been assuaged by a number of wise measures which have been taken. At first the purchase of the Cardington Mooring Mast complete with lifts was contemplated, but it is now said that the Croydon Control Tower is being put on wheels and will follow Hannibal up and down between Lympne and Croydon in case of a forced landing for weather. Moreover, a squad of mechanics is being trained to walk (and work) on 25-foot high stilts under the command of Mr. St. Irling, who mounts a fire-escape to drill them. They may be seen daily behind Shed Z, at the Aerodrome, learning the goose-step and the beri-beri dance.

Last week the Editor, who knows more of such matters than we do, corrected us in the matter of tails for anthropoid apes. Ringing up our Zoological expert, we found that after all our anonymous correspondent might just as easily have been "A Howling Monkey," described by him as "Producing a howling sound (or unsigned epistle) out of all proportion to its size, having a long prehensile tail and an ugly face surrounded with long hair." The Editor, as usual, wins.

Our Mr. Larkspur, by the way, is covered with confusion owing to an error he let slip into the Aeronautical Lexicon last week. He hears that no lettuce whatsoever is put into luncheon baskets, and, while he apologises profusely to all concerned, he cannot help just mentioning that he thinks it too bad to deprive the grey slug of its lettuce. Possibly it makes do with the tomato, but this is a choleric food, liable to make slugs snappish with strangers.

The De Havilland Aircraft Co. are to deliver, or may have delivered, two Puss-Moths to one Bata, the uncrowned king of a place called Zlin, which sounds like one of Lord Dunsany's fabulous cities. Quite incredibly, King Bata produces 100,000 pairs of boots and shoes daily in Zlin, and disapproves, like many old-fashioned magicians, of smoking. Mr. Broad is to deliver one of the machines, and a colleague the other.

It might not be business, but it would be great fun, to fill both machines with representatives of large Tobacco Concerns, complete with samples, previously telling them that King Bata wished to make huge purchases of cigars and cigarettes.

**MANY INVENTIONS (Nov. 24).**

The bad weather we have had lately brings to the fore once again the vexed question of flying through the Kenley Valley. There are only a limited number of bad weather routes in and out of Croydon Aerodrome and it is of the utmost importance to keep them open both to avoid traffic congestion in bad visibility and because in certain weather conditions one of them may be practically the only possible way through.

Commercial pilots do not fly through winter weather conditions for a whim but because they are engaged upon a useful job of work and one would suppose the Authorities would do everything possible to make their very difficult task as easy as possible. There is however a regulation that as soon as the weather begins to get bad, i.e., 1,000 yards horizontal visibility or less and cloud 1,000 ft. above sea level or less, a warning must be issued to Civil Aircraft that "fog conditions are in force." As this state of affairs by no means necessitates any fog anywhere the wording of the warning is exceedingly misleading and is quite a little triumph for the Whitehall gentleman who thought of it.

Stripped of this confusing camouflage, however, the warning actually amounts to nothing more or less than telling Civil Aircraft that the Kenley Valley is barred to them just at a time when they may have most need of it. Naturally, knowing Whitehall to be synonymous with Wisdom, you ask what excellent reason there is for this annoying prohibition.

If you were told it was because the R.A.F. had to seize the opportunity of "Fog Conditions" to practise ceremonial drill furtively, shrouded from the mocking gaze of possible passing infantry, you would not believe it, but at least it would be some sort of reason. When however you hear that the only reason the Authorities give is that the troops at Kenley *may* want to fly in bad weather themselves you are completely amazed, especially when you find that, so far as is known, Kenley people very rarely fly in bad weather (small blame to them), for they have not got to, and nobody in

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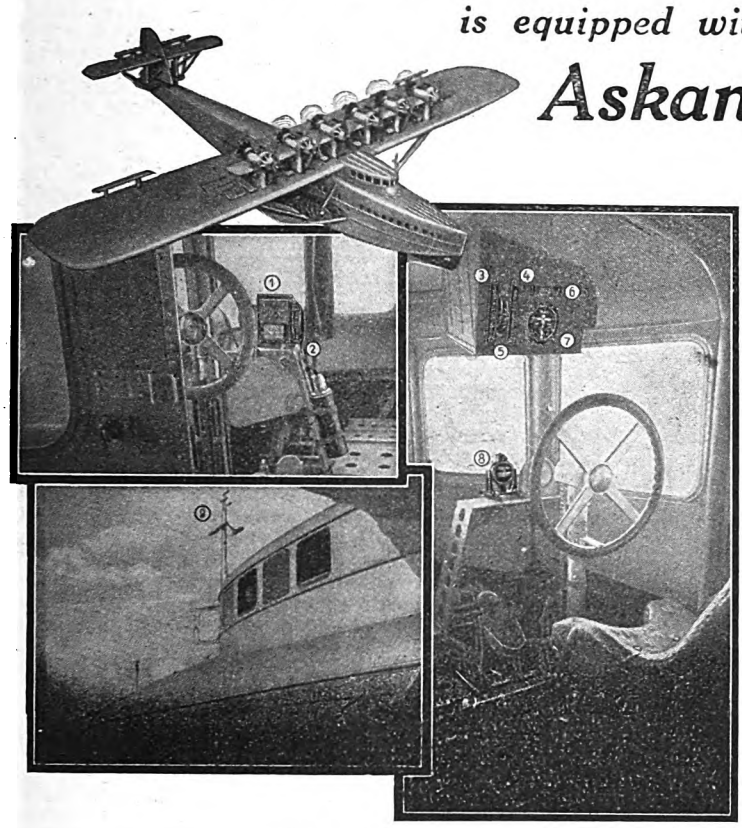

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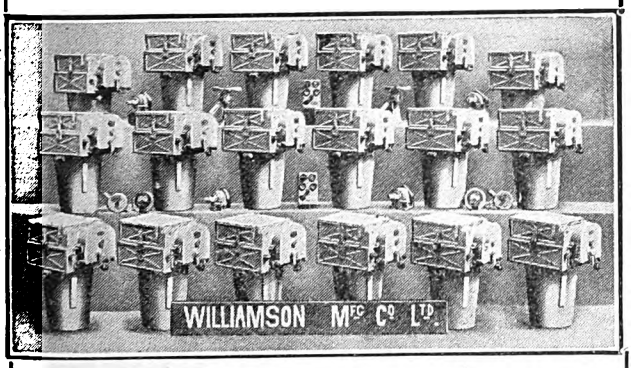


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their senses flies in poor visibility and low clouds unless compelled to do so.

Yet year after year for the best part of a decade Civil Aviation has been trying to get this futile regulation rescinded, only to be met with blank refusals somewhat cynically signed "your obedient servant." Logically (but not ministerially) Kenley should ring up Croydon when they are going to have a fog-flying party, and Civil Aircraft could then be warned to give the Kenley Valley a wide berth. We feel sure that our Kenley friends would be very much pleased to do this, as they themselves are always most helpful. In Whitehall however helpfulness is not always the order of the day as Civil Aviation has found to its cost in other ways.

Our Mr. Larry Larkspur is so worked up about it that he wanted to send the following poem to *The Daily Mail,* but we said, "Send it to THE AEROPLANE, Old Man, and have something published in a high-brow journal for once." So here it is. Take a deep breath, Gents:—

Loud sang the souls of the Civil Aviationers,
Fettered wrist to bar by a jolly Ministree,
When the weather is unpleasant,
As it often is at present,
We should love to fly to Croydon via gay Kenlee.

Loud stormed the voice of a richly-tabbed Officialdom,
Sitting soft in Whitehall with no end of fume and fuss,
No! you cannot fly o'er Kenley,
And we recommend you when *le*
*Temps* ain't quite auspicious, for to stay in bed,—like us.

Then stooped the Boss, and he called the Air Lords up to him,
And stablished an order, and he signed it "Amulree,"
"Since it ain't your lordly pleasure
For to fly in dampish weather,
You must let the blokes who need it use your silly valley,—see?"

Mr. Muir recently did a remarkably fast trip in the Henderson Aviation Bureau's Puss-Moth from Plymouth to Croydon, some 225 miles, in 100 minutes, carrying some Press photographs from the *Mauretania* for the *Evening News,* which got into the first edition. He is thought not to have had a head wind on this occasion.

Mr. Muir has a client of long standing who is a well-known contractor who suddenly made up his mind to become a private owner and ordered a Puss-Moth from Mr. Muir at 10 p.m. one night, and then rang him up before 9 a.m. next morning to know if the new machine was ready for flying. Although he is a pilot himself, this gentleman is going to get Mr. Muir to fly him when on business trips. A type of private owner this, who should live long.

PH-AEN, a K.L.M. machine which has just completed its fifth return trip on the Amsterdam-Batavia Mail Service, brought a cargo consisting of machinery spares, photographs, various samples and documents from Batavia to Amsterdam in ten days recently. Some consignments for Berlin were in time to catch the Amsterdam-Berlin air connection the same day, thus linking Berlin with Batavia in ten days. [Surely a quicker way would be to take the Berlin consignments off at Vienna or Budapest, or wherever the ship stops on its last stage westward, and to pick up freight there on the eastbound trip.—ED.]

Our Mr. Larkspur has been busy again with his little lexicon, here are his latest products.

*Aerobatics.*—Often the adventitious aerial activities of one not under his own control, but hoping feverishly for the best. If he survives he may claim and is usually awarded the benefit of the doubt. See Bats, Aero—Acro—Ding, also Belfries in.

*Air Correspondent.*—Finest type of blue-eyed, clean-limbed, genteel, young Nordic who . . . [Eh?—ED.]

Oh, dear. Oh, dear! Here's our Mr. Larkspur handed in his resignation at this point, sobbing and muttering something about "Trewth" being everything. He has broken his pen across his knee, and says he is going to spend the rest of his days in a Rookery, writing a book entitled, "A Hundred And Twenty Five Whyways Of The Skyways." Poor, poor gentleman.—SPRY.

## IN THE CITY.

BY G. P. KERR.

[These notes appear once in every Stock Exchange account and are intended to be of interest to those who hold or intend to hold investments in companies concerned directly or indirectly with aviation.]

| | | |
|---|---|---|
| Contango days .. .. | Dec. 1 .. | Dec. 15. |
| Account days .. .. | Dec. 4 .. | Dec. 18. |

From the talk in the sensational Press during the past fortnight of a "Boom in British aviation," one might almost believe that the only industrial shares worth buying belong to the aviation group. But are they?

Are they even worth their present price? Has the past account of Press propaganda succeeded in raising the average level of prices one thirty-second?

Rolls Royce, it is true, are up 6d. at 40/6 on the belated appreciation of the value of the Hawker contract, and Faireys are stronger at 12s. on the rumour that the report due shortly will make very excellent showing. But for the rest, Handley Page, Napiers, De Havillands and Imperial Airways—they are all lower on balance, and provide justification for my remarks in the issue of Nov. 19, "that investors need not be in a hurry to buy any of them."

Rolls-Royce are, of course, the exception, and might well be recommended to those semi-speculative investors who are content with a low yield of about 5% in return for good prospects of capital appreciation. For Rolls and Napiers have been—as far as water-cooled engines are concerned—the joint-heirs to the blessings of Air Ministry contracts.

The market considers that the real significance of the recent announcements lies in the fact that Rolls Royce appears to have snaffled the lot. A young stockbroker put the position pictorially in a delicious drawing of Napiers clothed like Esau waiting for the blessing of a paternal Air Ministry. Underneath was the legend: "Hast thou not kept *one* contract for me, O my father?"

So Napier shares are a weak market at about 9/6 instead of 10/6 a month ago. They have a par value of 5/- and have already received an interim dividend of 5%, and the final may be equally satisfactory. For the company is in a strong financial position. It has a capital of £1,028,000, of which £546,000 is in Ordinary shares of 5/- each. General reserves at the last balance-sheet amounted to more than the whole of the Ordinary issued share capital. If it is able to develop its new engine—the Napier Rapier—the shares may be worth buying. But not yet.

Handley Page 10% Participating Preference shares have fallen to 10/3. They have a par value of 8/-. Earlier this year they were as high as 16/-. Last year Preference shareholders received in all 12½%, and an interim of 5% has already been distributed.

On Oct. 22 I wrote that "it would be interesting to know how far the contract for Imperial Airways was proving profitable," and the subsequent fall in the price of the shares is considered in some quarters significant. I heard it suggested that the new machines were as successful as the Ark and took about as long to build. It is even rumoured that there was a time penalty clause attached to the contract and that a Director of Imperial Airways paid a visit to the Handley Page aerodrome the other day, and, watch in hand, cried—"Time, gentlemen, *please*! ! !"

A small business continues in Airways, and the price is slightly lower at about 18/6. I still think them over-valued, but I would prefer to hold them rather than De Havillands over the next few months.

The annual report of De Havillands is due at the end of this month. They made £48,709 last year and paid dividends of 10%, but not all the issued capital of £400,000 in £1 Ordinary shares ranked for the full dividend. I leave further discussion of the company's dividend prospects to next account, but in the meanwhile I suggest that it is at least arguable that despite the success of the Puss-Moth the Directors will see fit to reduce dividend distribution in order to conserve the resources—even supposing they have made £48,000 again this year.

A meeting of the holders of the 7% First Mortgage Debenture stock of National Flying Services is due to take place shortly. They are to be asked to consent to an alteration of the debenture trust deed—involving the sacrifice of some

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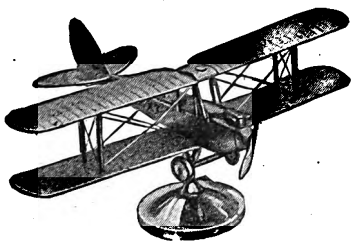

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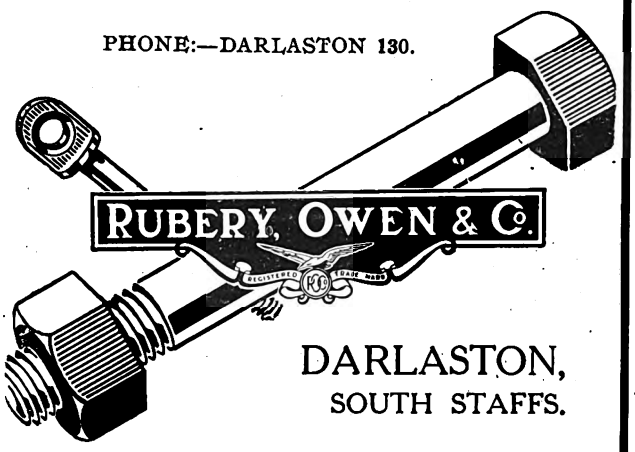


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of their rights and the creation of other debentures ranking before their own.

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| | Making-up Price. Nov. 17 | Dec. 1 | | Making-up Price. Nov. 17 | Dec. 1 |
|---|---|---|---|---|---|
| De Havilland ... ... | 30/3 | 29/6 | Nat Flg. Services Ord. 2/- | 6d. | 6d. |
| Handley Page 10% 8/- Pf. | 10/6 | 10/- | Do. do. Deb. | 40 | 40 |
| Fairey Aviation 10/- ... | 11/9 | 12/6 | Petters ... ... ... | 22/6 | 22/6 |
| Do. Deb. ... | 100 | 101 | Rolls-Royce ... ... ... | 40/- | 40/6 |
| Imperial Airways £1 ... | 18/9 | 18/6 | S. Smith & Son, 1/- Dfd. | 3/- | 2/6 |
| D. Napier ... ... ... | 10/1½ | 9/6 | Do. do £1 7% Pfd. Ord. | 30/- | 25/- |

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SOUTHAMPTON MUTUAL TRUST LTD.—Private company. Registered Nov. 27. Capital, £100 in £1 shares. Objects: To carry on banking and merchant banking business. Power is taken to carry on the business of photographers, mechanical, automobile, aeronautical, marine and general engineers, machinery manufacturers, colliery proprietors, manufacturers of chemicals and manures, distillers and dye makers, packing case manufacturers, printers, wood workers, cabinet makers, carpenters, joiners and ironmongers, dealers in wireless and other apparatus, general traders, carriers, ship builders, omnibus and taxi proprietors, forwarding agents, hotel keepers, etc. The first directors (to number not less than two nor more than 10) are: Sq. Cdr. J. Bird, R.N. (retd.), Grosvenor House, Park Lane, W.1 (permanent); C. R. Gray, "Redcourt," Southampton, C.A.; M. J. Jarvis, "Castleacre," Twyford, Berks, solicitor.

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## PERSONAL NOTICES.

BIRTH.

GARSTON-JONES.—On November 28, at a Nursing Home, Romford, Essex, to Lucy, wife of Kenneth Garston-Jones, R.A.F.O.—a son.

GREEN.—On Nov. 30, at 4, Milton Road, Bedford, to Dorothy Mary (née Hennessy), wife of Flt. Lt. G. D. Green, R.A.F.—a son.

ROPE.—On Nov. 29, at The Grange, Kesgrave, to Doreen, widow of Sq. Ldr. Frederic Michael Rope—a son.

YUILLE.—On Dec. 1, at 4, Parkside Gardens, Wimbledon, to Cecilia Frances, wife of Archibald Buchanan Yuille, D.F.C.—a son.

YOOL.—On Nov. 26, at Walton-on-Thames, to Claire, wife of Flt. Lt. W. M. Yool, R.A.F.—a son (stillborn).

DEATHS.

BARING.—On Sept. 14, 1930, at Shanghai, Henry Baring, late Captain, R.W. Kent Regt. and R.A.F.

Captain Baring was seconded to the R.F.C. from the R.W. Kent Regt. in August 1916 and after serving with various Units on the Home Establishment he was posted to No. 55 Squadron in France in July 1917. He also served in France with No. 27 and No. 49 Squadrons and in England with No. 22, No. 120 and No. 155 Squadrons. He was transferred to the Unemployed List in April 1919. Since then he has been engaged in educational work in Shanghai.

BROOKS.—On Nov. 25, at Leuchars, Fifeshire, as the result of a collision in the air, Flt. Lt. Gerald Brooks, R.A.F.

Flight Lieutenant Brooks served in the R.A.F. during the War 1914-18 and was appointed to a permanent commission in 1919 and posted to No. 210 Squadron at Gosport in 1920. In October 1921 he was posted to the R.A.F. Base, Gosport, where he remained until a recent date. He was promoted to Flight Lieutenant in July 1927.

HOWLETT.—On Nov. 25, at Leuchars, Fifeshire, as the result of a collision in the air, Flt. Lt. Alexander Harold James. Howlett, R.A.F.

Flight Lieutenant Howlett served in the R.A.F. during the War 1914-18 and retired in 1920 with the rank of Flying Officer. In January 1924 he was appointed to a short-service commission. He was posted, in August 1924, to the Fleet Torpedo Flight at Gosport and then to the Torpedo Training Flight. In October 1926 he was posted to No. 460 (Fleet Torpedo) Flight in H.M.S. *Eagle*. He was promoted to Flight Lieutenant in July 1928 and in September 1928 he was posted to No. 36 (Torpedo Bomber) Squadron. In October 1930 he was appointed to No. 100 (Bomber) Squadron.

GIBBON.—On Nov. 30, at Pinner, as the result of a flying accident, Flt. Lt. Douglas Wells Gibbon, R.A.F.

Flt. Lt. Gibbon entered the R.A.F. with a short service commission in March, 1925, and, after a course of flying training at No. 5 Flying Training School, Sealand, he was posted to No. 9 (Bomber) Squadron. In March, 1927, he was posted to No. 216 (Bomber) Squadron, Heliopolis, for air pilotage duties. He was promoted to Flight Lieutenant in May, 1930, and in August, 1930, he was posted to Henlow for a course of Engineering.

FORTHCOMING MARRIAGE.

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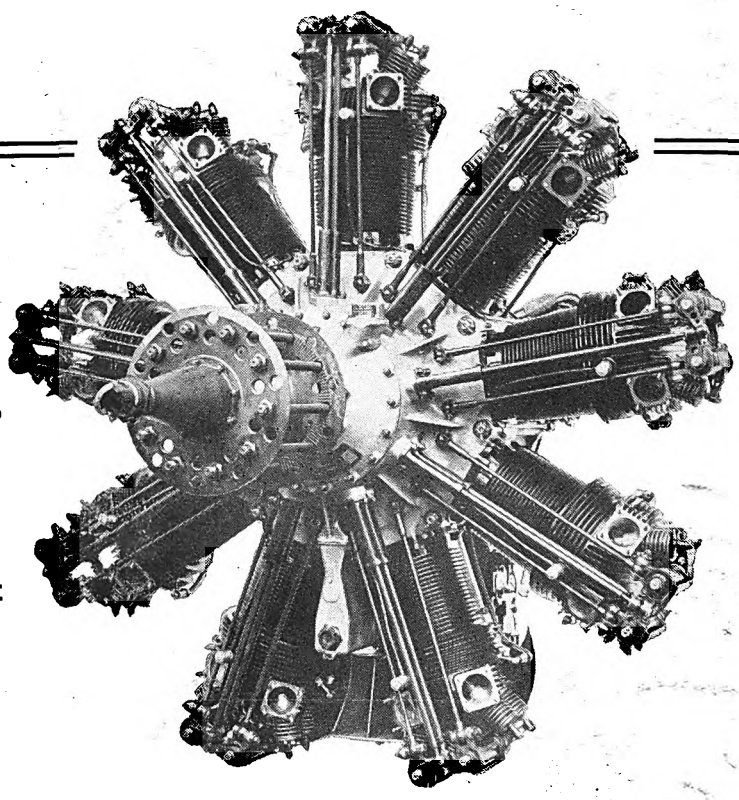

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# Second Paris Aero Show Number.

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6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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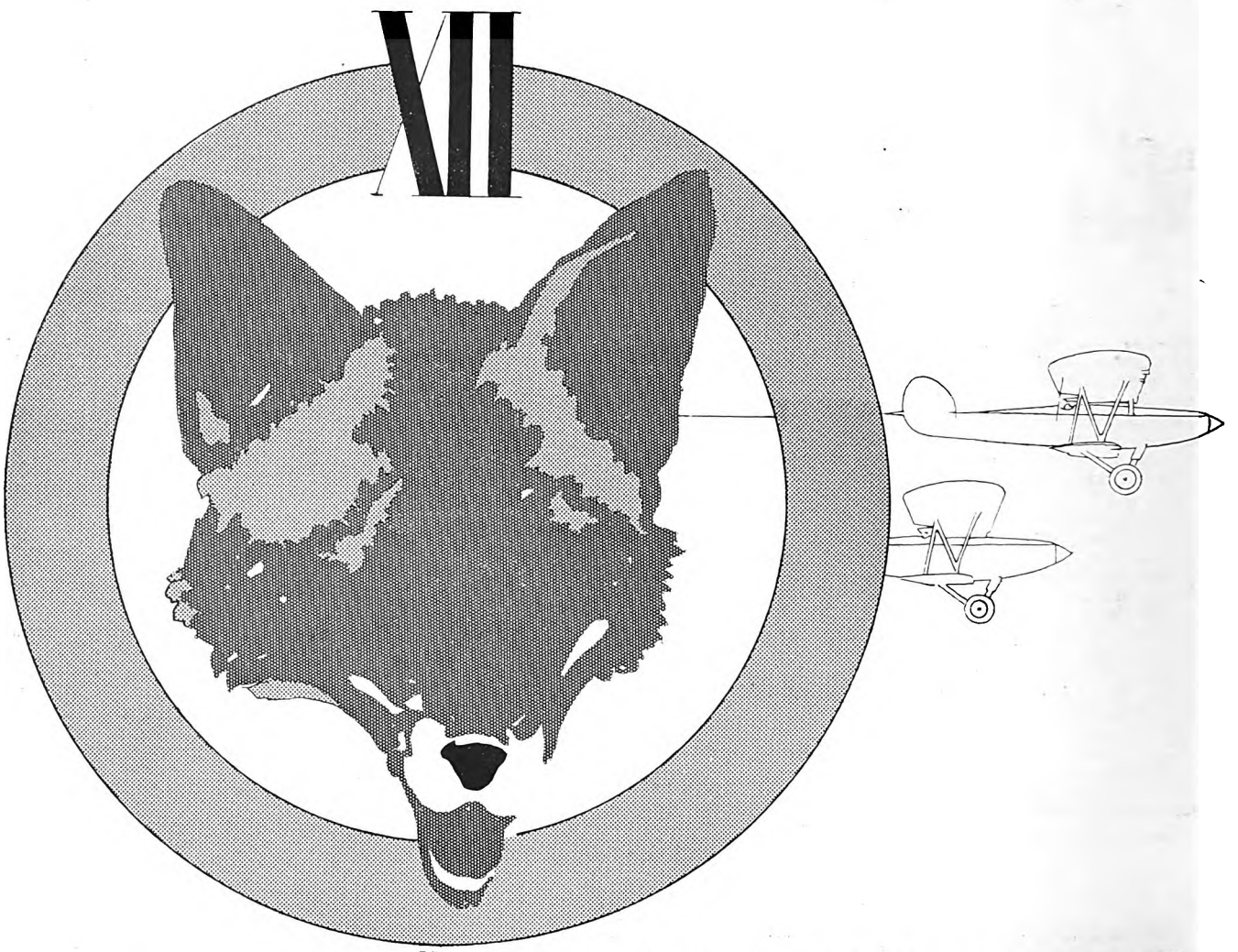


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Extract. "The Aeroplane," October 15th, 1930

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Incorporating

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VOL. XXXIX No. 25.

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## ON THE AERO SHOW IN PARIS.—II.

### Fellows in Adversity.

Besides the British representatives other foreign exhibitors at the Grand Palais had their own little troubles, and met with obstruction from the Show Authorities in little irritating ways. People who arrived early and wanted to work late on Tuesday or Wednesday to be ready in good time found the lights cut off at 6 o'clock in the evening, because apparently the French exhibitors did not want to go on working and nobody else counted.

The Ford Co. found at the last moment that the built-in centre-section of their trimotor job could not clear the doors of the Grand Palais by a few inches. They offered to pay for having the door removed and replaced,—the Authorities refused. They said that they would occupy their stand space (for which they had paid) with a desk and a big model and pictures,—the Authorities refused to allow it, models were for the gallery, and ground-floor space was for full-sized aeroplanes only. So the space and the money paid for it were confiscated. Ultimately the Ford people were allowed to sell half their space to a French firm, and a French Service machine was put on the other half.

The Fokker firm had difficulty in getting their exhibit ready, as they were let down by the non-execution of arrangements which should have been made in Paris before the machine arrived. The way the four or five good solid Netherlanders got that machine together when they were able to make a start on it was a joy to watch. But the big wing came near being wrecked when the French contractors started to haul it up on a defective block-and-tackle which slipped its ratchet as soon as it was asked to hold.

### French Government Generosity.

A letter from Sir Robert McLean, Chairman of Vickers (Aviation) Ltd., indicates that I did an injustice to the Government of the French Republic in our last issue. The French Government is not likely to make an international incident of it, but I am always ready to own up to a mistake, when we make one, which is seldom enough. Here is Sir Robert's letter:—

Sir,—We beg to refer to your editorial comments "On the Aero Show in Paris" on page 1274 of your issue of the 3rd instant, and particularly to your remarks regarding the proposed flight to France of a Vickers aircraft carrying armament.

Your information that the French Government and the "French Trade" have put difficulties in our way is quite inaccurate. As a matter of fact the French Air Ministry—with the full and courteous consent of the Syndicate of French Aircraft Constructors—have granted us full permission to fly a Vickers Vildebeeste fitted with guns and a torpedo (the latter, of course, a "dummy") over French territory, and to demonstrate same from le Bourget Aerodrome during the course of the Exhibition.

This permission was granted entirely without precedent, and, in view of the generous action of all concerned in France in this matter, we feel sure you will wish, in your next issue, to withdraw

"SCIENCE IS TRUE JUDGEMENT IN CONJUNCTION WITH REASON."
PLATO—*Theætetus.*

PRODUCTS OF BRITISH SCIENCE.—M. Gaston Doumergue, President of the French Republic, attended by M. Fernand Lioré, President of the Chambre Syndicale des Industries Aéronautiques, scrutinising the Rolls-Royce stand in the Grand Palais. The President is seen over the left shoulder of Lt.-Col. L. F. R. Fell (back view) and M. Lioré is on the President's right.

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your comments and to give our friends in France a proper acknowledgment of their courtesy.

Actually, our machine is now at Croydon awaiting weather before flying to le Bourget to carry out the demonstrations above-mentioned. The guns and torpedo have been admitted into France and were there before your issue appeared.

For Vickers (Aviation) Limited,
(Signed) ROBERT MCLEAN.
Chairman.

The information on which the offending statement was made came from a usually reliable source quite outside of Vickers Ltd. I apologise to the French Government for the error, and congratulate that Government on its broadminded action in permitting a machine fitted with arms to fly over France. The erroneous statement only referred to arms in boxes.

Another apology is owed to the Lodge Plug. In commenting on the British stands I omitted to mention the Lodge stand,—which was sad, seeing that the Lodge Plug won the Schneider Trophy for us, and is deemed particularly suited to the Rolls-Royce aero-engines. The omission was due wholly to the fact that I did not see the stand, and as I was only recording impressions, and was not writing a set report from a catalogue of the Show, that was probably because the Show people had hidden the stand away in a corner. Still, Mr. Bradbrooke, who has been doing the report of the accessories, while Mr. Bridgman has been doing the engines, will deal with the Lodge exhibit in due course.

Apropos a collective British exhibit, suggested last week. I have been told that the rules of the Show do not allow such a thing. But there was a collective Italian exhibit, and a collective German exhibit.

### SOME PRACTICAL POINTS.

After which, let us consider some more practical points about the show.—I have already touched on the merits of fabric compared with metal covering and on the benefits of abolishing wires as bracing. The next craze to be avoided is that for three-engined machines.

Whatever wind-tunnel tests may say I am convinced that the engine in the nose of a tri-motor is a waste of good engine and petrol. The banging of the slipstream from its airscrew makes most of the noise in the cabin and in making that noise it uses up a lot of its efficiency.

In a very big tri-motor with a huge geared airscrew on the nose there is enough of the blade outside the fuselage to do a fair amount of work, but the bigger the screw the more noise it makes and the more harshly it runs, and the more it shakes the machine to pieces. And a small screw just wastes itself pushing the slipstream past the body.

The longer we, meaning aeroplane designers of all nations, go on using motors in the noses of aeroplanes the longer we are putting off the day when aviation shall, as Mr. Churchhill said, fly by itself, without subsidies or artificial aids.

### TANDEM ENGINES.

If you are afraid to trust yourself to two engines, even when run well below full power, then use four,—in tandem pairs. And then be careful to put them where they can work free from obstruction.

The two outstanding examples of how to do it are (A) the new Short Singapore flying-boat, with four Rolls-Royces stuck well up between the wings where the slipstream does not flap the planes, and (B) the four-engined Fokker monoplane with the engines slung well below the wings.

I hear that the Singapore does more than 150 m.p.h., which is pretty good going for a big flying-boat with long range and plenty of room inside. To get a performance like that you cannot afford to force your slipstream over acres of planes and fuselages, and through forests of struts.

Given tandem engines you have the problem of keeping the aft engines cool. The trouble with all that have been tried so far is that, if the forward engine stops, the aft engine becomes a glowing mass in a few minutes.

If you are silly enough to use a nose radiator with the airscrew-shaft of a water-cooled engine sticking through it, then you waste power because you blanket the blades of your airscrew, and you carry a lot of unnecessary radiator and water because the air does not go through the radiator tubes at all within a foot or so of the centre of the airscrew. Actually inside that area the air goes forward from the engine, because the thick part of the airscrew acts as an exhaust fan.

Furthermore, if the front engine of the tandem pair stops then the blast from the airscrew stops and the probability is that the aft engine begins to boil. That trouble can be got over comparatively easily by having disappearing radiators which can be pushed in and out to give more or less surface as may be required. And so long as the machine keeps up a reasonable speed through the air the radiators ought to be enough to keep it cool even without the direct blast from the screw.

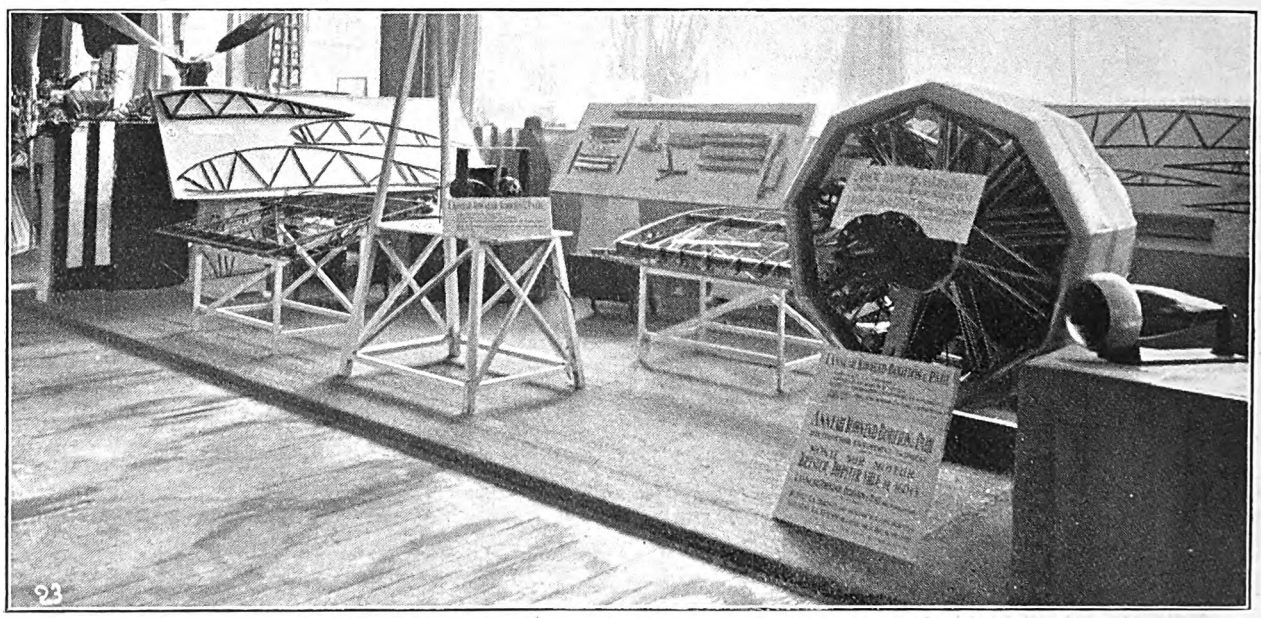
The difficulty of cooling the aft engine in a tandem pair of air-cooled engines is still greater, but so far nobody has tackled the problem seriously. All those that have been built so far have depended entirely on the blast from the tractor screw in front to keep the pusher engine cool. But there are those who believe that with a proper system of cowling you can get an induced draught round the cylinders that will be enough to keep the biggest radial engine cool.

### COOLING PUSHER ENGINES.

This is a problem that ought to be tackled seriously because sooner or later, despite the obtuseness of orthodox designers, we shall come to using pusher screws and nothing else, and then we shall be forced to devise some means of keeping our engines cool. I am inclined to think that when everybody uses metal airscrews, as they will some day, something might be done by making the innermost part of the blade, or the shaft which holds the blade, or the airscrew boss itself, into some kind of a suction fan.

There is even a possibility that blades might be so fitted on the otherwise useless inner part of a wooden airscrew as to suck enough air through a cowling to keep the engine cool.

In any case a little attention given to making four-engined machines efficient would produce considerably more progress than merely building three-engined tractors. We had the perfect proof of this quite recently in England. A certain firm built a monoplane intended to be used fitted with one, two or three engines as the buyer wishes. It



**THE TRIUMPH OF THE METALLURGIST.—The Boulton and Paul Stand in the Grand Palais, showing the Townend Ring on a Jupiter engine, and the whole system of B. and P. all-metal construction.**

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# *Another successful R.A.F. flight with NAPIERS*

"R.A.F. WEST AFRICAN FLIGHT

THE flight of No. 47 Bomber Squadron, under the command of Sqdn.-Ldr. E. L. Howard-Williams, M.C., which has flown in formation from Khartum to Bathurst, in Gambia, has arrived back at Khartum.

This is the first time that a unit of the Royal Air Force has visited the Colony of Gambia, on the West Coast of Africa, though, more than once, units have flown as far as Kano, in Nigeria. No rumour of any mishap to this flight has been reported. It has been an entirely successful undertaking, and it reflects great credit on the squadron and its commander, on the Fairey 3 F aeroplanes, and last but by no means least, on the Napier Lion engines."

FLIGHT,
28 *Nov.*, 1930

*On this flight 28,000 engine miles were flown*

# NAPIER

*The finest aero engine in the World*

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was fitted with three very good engines whose aggregate horse-power ought to have been quite enough to make the machine fly well. When it was tested it could scarcely pull itself off the ground. The three engines were taken out and it was fitted with two engines of the same total horse-power. And it immediately became one of the best flying machines in the country.

A SIMPLE LESSON.

A lot of humour could be got at the Paris Show by getting hold of an aerodynamic expert, taking him up to a high point in the gallery and pointing out to him all the wings of the Earth, so to speak, and then asking him which of them were right. There were square-ended wings with ordinary hinged ailerons. There were wings which tapered from back to front, with straight leading edges and inset ailerons. There were wings which tapered towards the tips both back and front. There were wings in which the leading edge and the trailing edge were parallel, but the trailing edge was longer than the leading edge, with the result that the ailerons had horrible projecting corners which were bound to dig into the air and make the machine spin or drop a wing.

There were ailerons with horn balances and inset balances and Frise balances. There were thin wings with slots and there were thick wings without slots. There were wings which looked as if they had been moulded by an artist. There were wings which looked as if they had been built by some sort of sausage machine process and sawed off to length as requisite.

None of my expert friends could justify the faith which was in him by pledging his honour that any one of those types was right. And between the lot they were clear enough proof that nobody has any exact knowledge of the Science of Aeronautics.

The nearest I could get to anything like a definite statement came from one designer who laid down as an axiom the statement that if you saw an aeroplane with swept back wings that was convincing proof that the designer did not know where his centre of gravity was. If his dogma can be accepted then quite a lot of designers are singularly ignorant about centres of gravity

A PROBLEM TO BE PROVEN.

Another aerodynamic expert of note laid down the law to the effect that slots make a moderately bad wing usable but do nothing to improve a good wing and will not save a really bad wing if it and its aileron arrangement are bad enough.

This is a subject which should be well worth debating. We have used thin wings for so long in this country that we have almost grown to believe that the slot is indispensable. But nobody in this country seems to have gone seriously into the aerodynamics of building a thick wing with the right sort of tip and the right sort of aileron,—except for the new Avros and the Vickers Viastra.

Also, nobody has ever bought a Fokker with its own type of wing and then fitted slots on it to see what would happen. Furthermore nobody has ever taken a really good section of thick wing and fitted slots all the way along it to see what effect it would have on the landing speed. These are all experiments which a moderately well-to-do manufacturer could try out for himself. And the Air Ministry ought to have tried them out years ago. Nothing other than definite tests of this kind can settle the question of whether we might after all be just as well without the slot and its accompanying expense and weight and complication.

Unfortunately manufacturers of all nations seem to regard the opinions of their own pet designers as infallible, and our Air Ministry is so continually busy with basic research, which means hunting through haystacks in the hopes that you may find some needle or other, if there happens to be a needle there, that they never will spend anything on *ad hoc* research, which means pulling a piece of cotton to see if there is a needle on the other end.

BRAKES.

One thing which was quite noticeable at the Paris Show was the general use of brakes. I was glad to hear that Palmer Brakes have been very largely used on the Continent, even when Palmer Tyres are not used. The simple all-round action of the Palmer Brake seems to appeal to practical men. And there were Bendix brakes and lots of others.

Talking of wheels suggests that the attention of designers should be directed to the use of streamlined spats on landing wheels. So far I have never seen an English machine with spats. The idea originated in the States. But the French seem to have taken up the idea quite largely.

It is really quite sensible. Definitely the head resistance of the wheel and undercarriage struts is reduced by fitting well-designed spats, and the spats act as mud-guards which in any case have to be fitted on multi-engined machines to prevent mud being thrown into the airscrews of the wing engines. Presumably we shall take to spats in this country some day.

FOLLOW MY LEADER.

As I have already remarked, the Show was notable for its lack of originality. Of all the multi-engined machines in the Show, whether copies of Fokkers or copies of Junkers, the old original Fokker still seems better than any of them. The only real freak in the Show was the twin-hulled Blèriot, which struck me personally as being very nearly the silliest aeroplane I have ever seen.

Anyhow, if M. Blériot is not to prove a public benefactor by introducing this type of design, he may be regarded as such by virtue of the new Blériot Trophy, a replica of which was on his stand. The Trophy is the figure of an aviator in metal with his hands pointed in front of him in a diving position being borne up by four rather beautiful figures in marble, presumably representing the four winds. The aviator looks a trifle like an anthropomorphic torpedo. But the general effect is at any rate striking.

The Trophy is to be held by the aviator who makes the greatest speed year by year and it is to be allocated definitely to the first aviator who puts up a speed of 1,000 kilometres per hour. That means only a little over 600 m.p.h., so we are more than half-way towards it already.

RETRACTABLE UNDERCARRIAGES.

Some attempts have been made to produce retractable undercarriages. The Blériot is quite a good effort and it really does disappear into the wing. And the Couzinet certainly does away with most of its head resistance. This seems to be one of the directions in which we can definitely hope for an improvement in performance. But I can foresee quite a lot of crashes while the perfect retractable undercarriage is being produced. And I can foresee quite a lot of innocent fun being caused by absent-minded pilots forgetting to drop their undercarriages when landing.

Several people have already forgotten to do so when landing amphibians, but that is not quite so serious because there is generally a good boat hull on which to land. The result of landing a heavy passenger-carrier on top of a cabin filled with passengers would not be so funny.

THAT POLISH MACHINE!

Where ordinary undercarriages are concerned certainly the best in the Show was that in the Polish single-seat fighter. In this—as shown last week—two ordinary streamlined struts on each side are held against landing strains by a plain streamlined wire. All the oleo gear and the levers in connection with it are tucked away right inside the fuselage.

Actually that Polish fighter is said to be the best single-seater built on the Continent of Europe. With an ordinary Jupiter VI engine, not supercharged and not geared, it has a top speed of 180 m.p.h. Also, it seems to be unbreakable.

One of the Polish sportsmen on the stand asserted firmly that one of these machines, but with a water-cooled engine, had been dived from 15,000 feet to 300 feet in 44 seconds. When I suggested that the increase in pressure in such a brief time ought to have been enough to put the pilot out, he remarked blandly, "Oh, no. Two whiskies. All right." I imagine that if the average man did a dive of that sort somebody would have to "pickle his bones in alcohol," according to the words of the war-time song.

ENGINES.

On the engine side the French Trade seems to be even less progressive than it is on the aeroplane side. Two firms are producing 4-cylinder air-cooled engines, more or less on the lines of the Cirrus or the Gipsy. But nobody has produced a really nice inverted engine, which is obviously the right thing for any aeroplane, unless one is going the whole hog and is going to produce an eight-cylinder or twelve-cylinder double-opposed horizontal engine to build flush into the wings. This, which is an eminently sensible type, seems to have vanished. Even the perennial Caffort seems to have disappeared.

There are several new types of well-known radial air-cooled engines, but they are only variants in the number of cylinders or the bore and stroke or the superchargers.

The Clerget company show what look like a perfectly normal radial engine with apparently two large valves in the cylinder-head and provision for oil pumps. It was alleged to be a heavy oil engine, but no figures were given about its weight or consumption or anything.

The Lorraine company have some really beautiful pieces of work on their stand, as befits a firm which holds so many World's records and has such an amazing record of first-class engineering production. The firm made guns for the great Condé some 300 years ago, and some of the Directors, besides many of the workpeople, are direct descendants of the original officials and hands of the firm.

Also the 1,000 h.p. Hispano-Suiza, which has given 1,650 h.p., is a very impressive sight. We may find it a worthy rival in the Schneider Contest.

As indicated last week, the displays of engines by the Armstrong Siddeley Motor Co. Ltd. and the Bristol Aeroplane Co. Ltd., and Rolls-Royce Ltd., were enough to con-

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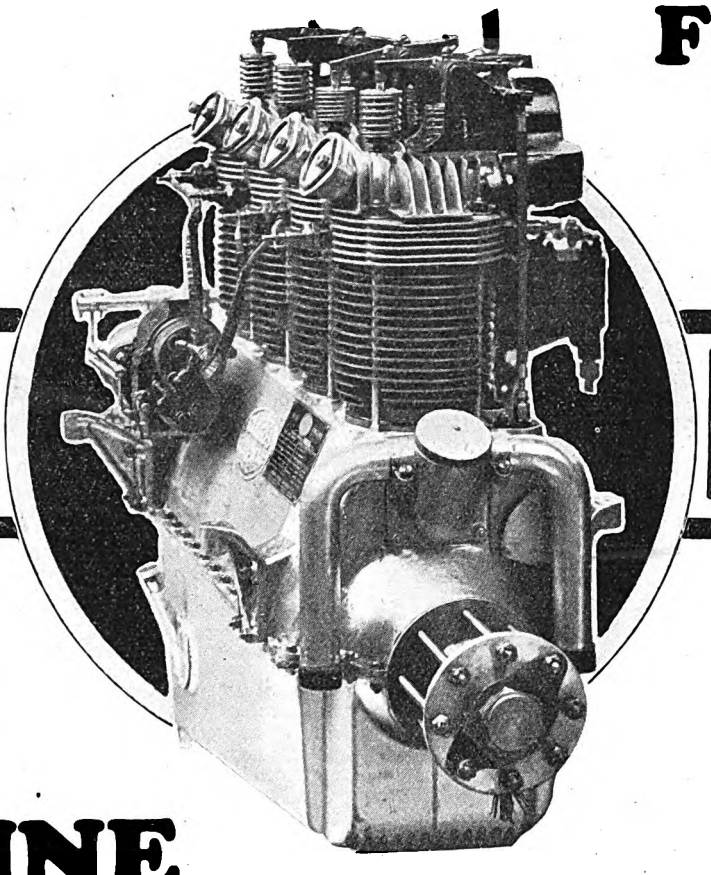
OVERGROUND

# CHANGE FOR

CIRRUS



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vince any foreign visitor that the British Aero-Engine Trade can do rather better than hold its own.

We have heard a good deal about the nitrided cylinders of the Hispano-Suiza, which certainly do give astonishing durability, as the firm's list of World's Records shows, but there was no water-cooled engine in the Salon to compare with the Rolls-Royce on a weight-for-power basis. This firm did what many people must have thought a very brave thing in showing one of their engines sectioned so that all the working parts could be seen, including the supercharger.

Apparently the Rolls-Royce Company take the very sound view that there is no harm in letting anybody see what they have made because seeing a made article is quite a different thing from knowing how to make it. And certainly anybody who inspected the "F" engines in detail can only have been filled with admiration of the finished article, while remaining hopelessly puzzled about how it was done.

There is no disputing the fact that although the Rolls-Royce engine did a great service to British Aviation by winning the Schneider Trophy for us it has given the British Aircraft Industry a far greater advertisement by making possible the production in this country of the four fastest fighting machines in the World. People may envy us the winning of a so-called sporting event, but they respect us a whole lot more for having fighting power.

Taking it all round, the Show was quite interesting. It was disappointing because there was really nothing new in it about which anybody could be enthusiastic, but it was useful in that it showed a whole lot of ideas which are obviously to be avoided by intelligent aircraft and engine designers. And there were a good many rather clever little notions, essentially French, which might be adopted or developed with benefit to ourselves. But every British subject who visited the Show must have come away with a comfortable feeling that there was nothing in it which could not be easily beaten in its own class by several products of the British Aircraft Industry.—C. G. G.

## THE SCHNEIDER TROPHY CONTEST, 1931.

The conditions for the 1931 Schneider Trophy Contest have been discussed at a meeting of the Sports Committee of the Fédération Aéronautique Internationale which was held in Paris last week.

The results of the deliberations of the meeting are that the Royal Aero Club will receive the entrance fee of 200,000 francs per machine, for which it originally asked, but this sum may now be in the form of a banker's guarantee. No actual transfer of cash need be made unless a competing Club fails to take part in the contest. In such an event the Club will forfeit its deposit.

The conditions of the actual contest will remain as before, that is, it will be held over a course of at least 50 kilometres (31 land miles) long and the competitors will be started at predetermined intervals.

The suggestion had been made that the course should be made shorter and that competitors should start together, but these suggestions were ruled out.

The Committee decided that the contest shall be held between Aug. 24 and Sept. 19, 1931, but the question of the place of the contest was apparently not raised.

The Italian Aero Club has stated that it will refuse to compete over the Solent again, owing to the congested state of the water there during the training period. The Italian Aero Club had previously offered to organise the contest at Venice without expense to the other competing Clubs, but this was before the settlement of the question of the entrance fee of 200,00 francs demanded by the Royal Aero Club to which both Italy and France took exception.

By the rules of the contest, if the holder of the Trophy is unable to organise the next race, the previous holder, in this case Italy, must do so, and if this also is impossible, the F.A.I. takes charge of the arrangements. However, there can be no doubt that the Royal Aero Club will be able to find a suitable locality, but the difficulties met with in 1929 will be remembered.

At that time several towns offered to make all suitable arrangements for the accommodation of the huge crowds that were expected, but the poor support given to the municipal stands and other arrangements at Southsea and Portsmouth may have a sobering effect on the other towns for next year's contest.

On Dec. 8 a conference was held at the Royal Aero Club between the Schneider Trophy Committee of that body and the Air Council. No definite conclusion was reached concerning the organisation of the contest and the likelihood of Air Ministry support, but the general impression is that the Air Ministry will help to the best of its ability, say by lending pilots and the existing machines, so long as it does not have to find any money.

A sub-committee was set up to examine the whole situation, particularly with regard to difficulties which might arise if both the Air Ministry and the Royal Aero Club were concerned in the arrangements for defending Great Britain's possession of the trophy.

## THE VISIT OF THE Do.X TO CALSHOT.

In the House of Commons, on Dec. 3, in reply to a question by Mr. Smithers, the Under-Secretary of State for Air said that no bill for expenses had been or would be presented by the Air Ministry to the officer commanding the Do.X as a result of the visit of that aircraft to this country. No specific international agreement governing arrangements for visits such as that of the Do.X existed, but all customary courtesies were shown and received.

Replying to Captain Balfour, Mr. Montague said that payment in respect of the use by civilians and others of R.A.F. transport from the shore to civilian air liners came out of public funds, but the amount was comparatively small and he would point out that our own technical experts and officers had the fullest opportunities of examining Do.X.

## ABOUT AERODROMES.

On Nov. 30, Capt. W. R. Baldwin-Wiseman read before the Society of Engineers a paper on The Ground Organisation of Aviation, which is considered by good judges to be the most important general disquisition yet published on the lay-out of aerodromes. By kind permission of that Society The Aeroplane will publish the paper in full in the *Aeronautical Engineering Supplement* on Dec. 31.

As Col. Paul Henderson, then Assistant Postmaster-General of the United States, who had just organised the 100 m.p.h. air-mail line between New York and San Francisco, remarked some six or seven years ago, "The success of an airline is on the ground." And the ground engineering of civil aviation is just as important a branch of aeronautical engineering as is the design of aeroplanes or engines. Therefore all who are concerned with operating aeroplanes, whether as managers of air-lines, taxi-services, joy-ride firms or clubs, should make sure of getting a copy of The Aeroplane of Dec. 31, as a good start for the New Year.

But before publishing the paper we must correct an error which Capt. Baldwin-Wiseman made in his preliminary remarks. Evidently it arose through his being misinformed on a subject which was outside his own knowledge, for on his own subject his information is unquestionable. He said:—

> It is estimated that in the United States there are now 35,000 aeroplanes at work, served by about 13,000 landing grounds, of which 370 are municipal airports. They also contemplate spending about £105,000,000 on the construction of aerodromes and the equipment of aerial routes during the next two years.

Unfortunately for these figures, which are evidently quoted to show us our own littleness and backwardness, and are evidently intended, laudably enough, to encourage us to more strenuous endeavours, the truth is very much otherwise. The official report, recently issued by Major Clarence M. Young, Director of Aeronautics, Department of Commerce, Washington, D.C., states:—

> Of the 6,786 licensed airplanes in the United States to-day, about 650 are employed in scheduled air transport. It is estimated that of the remainder, approximately 20 per cent. are used for pleasure flying and 80 per cent. for miscellaneous commercial activities.

So bang goes about 28,000 airplanes! But even so, the remaining 7,000 (nearly) are enough to encourage us to effort. Something like 1,200 airplanes flown for pleasure and something near 5,000 used for miscellaneous commercial acitivities is not so bad, considering that the population of the United States is only about double that of Great Britain and is about a quarter that of the British Empire.—C. G. G.

## FRUITS OF INCREASE.

The air port of Le Bourget is overcrowded, and the gradual increase of air traffic is accentuating the difficulties therefrom. In the hope of relieving the congestion the French Air Ministry has asked for the allocation of 400,000,000 francs (£3,200,000) out of the credits for the national equipment scheme for the purpose of extending or removing the present Le Bourget Aerodrome.

The position of Le Bourget will, according to *The Times*, probably decide in favour of its retention, but it may be enlarged and the *Armée de l'Air* may be taken elsewhere.

## SAUL AMONG THE PROPHETS.

When the Daily Press takes to being technical it is well worth reading. This for example:—

> As a result of *the introduction of streamlines*, the reduction of the frontal area, and the *elimination of all parasite space*, the superiority of British machines is being more and more recognised throughout the world.
>
> The chief factor in this success is the infinite care which is taken to ensure reliability. Every part of the machine, from the *original billet*, is subjected to most stringent tests throughout construction, and every piece of metal is proofed against corrosion from both fresh water and sea water.

## GOOD BOOKS WANTED.

If any reader of The Aeroplane has written a really good book on any aspect of flying, technical or non-technical, the Editor will be glad to know of it. A well-known firm of Publishers is anxious to produce books on aeronautical subjects if they can be assured that they are competently written. And there is plenty of market for good books on flying, because most of those published so far have been so bad.

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*Blackburn-Bluebird G-AAIR.*

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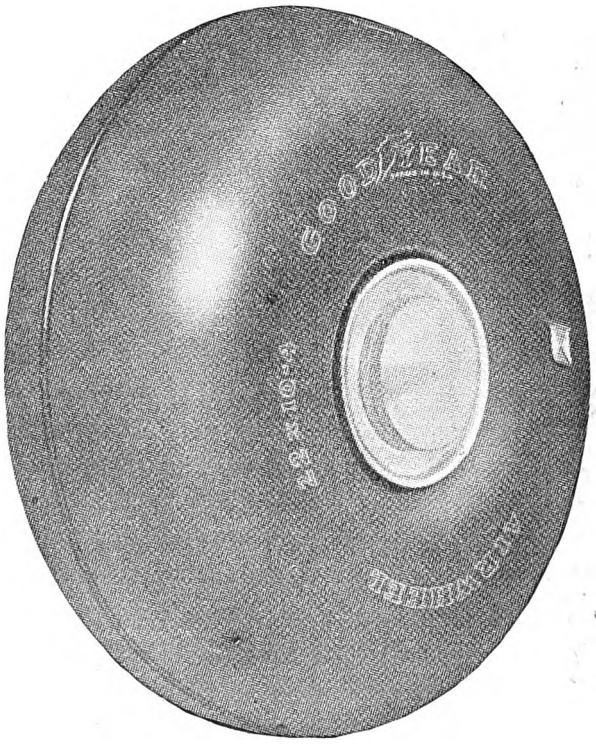


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# SPECIFICATIONS OF THE AERO-ENGINES AT THE PARIS SHOW.

| Maker. | Type. | No. of cylinders and disposition. | Output (Normal and maximum,) | Normal airscrew r.p.m. | Compression ratio | Bore and Stroke (m/m) | Weight (kgs.) | Dimensions. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Length | Width | Height | Diameter |
| ARMSTRONG SIDDELEY ... | Genet ... ... ... | 5 cyl. rad. | 80- 88 | 2200 | 5.25 | 101.6 × 101.6 | 95.4 | 0.713 | — | — | 0.85 |
| | Genet-Major (5-cyl) ... | 5 cyl. rad. | 100- 110 | 2200 | 5.35 | 108 × 114.3 | 113.5 | 0.905 | — | — | 0.95 |
| | Genet-Major (7-cyl) ... | 7 cyl. rad. | 140- 155 | 2200 | 5.35 | 108 × 114.3 | — | 1.13 | — | — | 0.95 |
| | Mongoose ... ... | 5 cyl. rad. | 150- 165 | 1850 | 5 | 127 × 139.7 | 166 | 0.891 | — | — | 1.137 |
| | Lynx ... ... ... | 7 cyl. rad. | 215- 235 | 1900 | 5 | 127 × 139.7 | 248.6 | 1.006 | — | — | 1.137 |
| | Double-Mongoose ... | 10 cyl. rad. | 342- 350 | 2200 | 5 | 127 × 139.7 | — | 1.32 | — | — | 1.137 |
| | Jaguar ... ... ... | 14 cyl. rad. | 400- 446 | 1700 | 5 | 127 × 139.7 | 388.3 | 1.181 | — | — | 1.137 |
| | Panther ... ... ... | 14 cyl. rad. | 507- 549 | 2000 | 5 | 133.3 × 139.7 | 415 | 1.564 | — | — | 1.187 |
| | Leopard ... ... ... | 14 cyl. rad. | 700- 800 | 1500 | 5 | 152.4 × 190.5 | 664.4 | 1.49 | — | — | 1.48 |
| B.M.W. ... ... ... | Wasp (license) ... ... | 9 cyl. rad. | 450- 480 | 2100 | — | 146 × 146 | 324 | 1.08 | — | — | 1.31 |
| | Hornet (license)... ... | 9 cyl. rad. | 525- 575 | 1950 | — | 158 × 171 | 376 | 1.138 | — | — | 1.44 |
| | VIIA. U. (geared) ... | 12 cyl. vee | 600- 770 | 1530 | 6 | 160 × 190 | 560 | 2.028 | 0.846 | — | — |
| BRISTOL ... ... ... | Jupiter IX.F. (geared) ... | 9 cyl. rad. | 515- 550 | 2000 | 5.3 | — | 408 | — | — | — | — |
| | Mercury IV.A. (geared) | 9 cyl. rad. | 490- 550* | 2250 | 5.3 | — | 431.3 | — | — | — | — |
| | Mercury V.A. (geared) | 9 cyl. rad. | 515- 550† | 2000 | 5.3 | — | 451.7 | — | — | — | — |
| CHAISE ... ... ... | AV. 2 ... ... ... | 4 cyl. vee inv. | 100- 110 | 2000 | 5.5 | 120 × 140 | — | 0.991 | 0.59 | 0.695 | — |
| ELIZALDE ... ... ... | Dragon V. ... ... | 5 cyl. rad. | 165- 180 | 1800 | 6 | 130 × 140 | 170 | — | — | — | — |
| | Dragon VII. ... ... | 7 cyl. rad. | 320- 350 | 1800 | 5.25 | 150 × 150 | 300 | — | — | — | — |
| | Superdragon ... ... | 9 cyl. rad. | 525- 570 | 1800 | 5.5 | 150 × 170 | 380 | — | — | — | — |
| FARMAN ... ... ... | 7E.A (geared) ... | 7 cyl. rad. | 165- 200 | 2150 | — | 115 × 135 | 160 | — | — | — | — |
| | 9E.A (geared) ... | 9 cyl. rad. | 210- 260 | 2300 | — | 115 × 120 | 265.5 | 1.169 | — | — | 1.06 |
| | 8V.I (geared) ... | 8 cyl. vee inv. | 350- 400 | 2400 | — | 135 × 140 | — | 1.79 | 0.95 | — | — |
| | 12W.I (geared) ... | 12 cyl. vee inv. | 550- 650 | 2400 | — | — | 400 | 1.5 | 1.1 | 0.9 | — |
| | 18W.I (geared) ... | 18 cyl, "w" inv. | 600- 750 | 2800 | 6 | 110 × 125 | 422 | 1.61 | 0.78 | 1.08 | — |
| FIAT ... ... ... | A.20 ... ... ... | 12 cyl. vee | 430 | 2060 | 5.7 | 115 × 150 | 330 | — | — | — | — |
| | A.22R (geared) ... | 12 cyl. vee | 560 | 2100 | 5.5 | 136 × 160 | 530 | — | — | — | — |
| | A.22T ... ... ... | 12 cyl. vee | 570 | 1900 | — | 135 × 160 | 420 | — | — | — | — |
| | A.24 ... ... ... | 12 cyl. vee | 700 | 2000 | 5.7 | 140 × 175 | 480 | — | — | — | — |
| | A.24R (geared) ... | 12 cyl. vee | 700 | 2050 | — | 140 × 175 | 520 | — | — | — | — |
| | A.25 ... ... ... | 12 cyl. vee | 950 | 1900 | 5.25 | 170 × 200 | 840 | — | — | — | — |
| | A.S.3 ... ... ... | 12 cyl. vee | 1000 | 2500 | — | 140 × 170 | 395 | — | — | — | — |
| | A.S.5 ... ... ... | 12 cyl. vee | 1000 | 3200 | 8 | 138 × 140 | 354 | — | — | — | — |
| | A.50 ... ... ... | 7 cyl. rad. | 100 | 1800 | — | 100 × 120 | 130 | 0.78 | — | — | 0.9 |
| GNÔME ET RHÔNE... ... | Titan ... ... ... | 5 cyl. rad. | 240- 255 | 1800 | — | 146 × 165 | 255 | — | — | — | 1.31 |
| | Titan K ... ... ... | 5 cyl. rad. | 240- 285 | 2000 | 5.8 | 146 × 165 | 240 | 1.21 | — | — | 1.15 |
| | Titan-Major ... ... | 7 cyl. rad. | 300- 370 | 2050 | 5.5 | 146 × 165 | 285 | 1.26 | — | — | 1.23 |
| | Jupiter VII ... ... | 9 cyl. rad. | 510 at 4000m. | 2000 | — | 146 × 190 | 380 | — | — | — | 1.4 |
| | Mercure ... ... ... | 9 cyl. rad. | 525 at 4000m. | 2000 | — | 146 × 190 | 410 | — | — | — | 1.4 |
| HISPANO-SUIZA ... ... | 6.Pa ... ... ... | 6 cyl. line | 100- 145 | 2000 | 5.5 | 110 × 140 | 170 | 1.362 | 0.537 | 1.021 | — |
| | 8.Ad ... ... ... | 8 cyl. vee | 180- 210 | 1800 | 5.3 | 120 × 130 | 210 | 1.233 | 0.84 | 0.934 | — |
| | 6.Mb ... ... ... | 6 cyl. line | 250- 280 | 2000 | 5.5 | 130 × 170 | 270 | 1.693 | 0.537 | 1.06 | — |
| | 8.Fb ... ... ... | 8 cyl. vee | 300- 320 | 1800 | 5.3 | 140 × 150 | 265 | 1.525 | 0.896 | 0.886 | — |
| | 12.Jb ... ... ... | 12 cyl. vee | 400- 460 | 2000 | 6.2 | 120 × 150 | 355 | 1.645 | 0.702 | 0.984 | — |
| | 12.Hbr (geared) ... | 12 cyl. vee | 500- 580 | 2000 | 6.2 | 140 × 150 | 470 | 1.89 | 0.732 | 1.006 | — |

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| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HISPANO-SUIZA ... ... | 12.Gb ... ... ... | 12 cyl. vee | 500- 585 | 2000 | 6.2 | 140 × 150 | 390 | 1.794 | 1.142 | 0.996 | — |
| | 12.Lb ... ... ... | 12 cyl. vee | 600- 630 | 2000 | 6.2 | 140 × 170 | 440 | 1.852 | 0.756 | 1.028 | — |
| | 12.Nb ... ... ... | 12 cyl. vee | 650- 750 | 2000 | 6.2 | 150 × 170 | 475 | 1.779 | 0.8 | 1.034 | — |
| | 12.Nbr (geared) ... | 12 cyl. vee | 650- 740 | 2000 | 6.2 | 150 × 170 | 520 | 1.959 | 0.8 | 1.034 | — |
| | 18.Sb ... ... ... | 18 cyl. "w" | 1000-1125 | 2000 | 6.2 | 150 × 170 | 540 | 1.995 | 1.33 | 1.171 | — |
| | 9.T (Clerget-license) ... | 9 cyl. rad. | 220- 225 | 1800 | — | 130 × 170 | 310 | — | — | — | — |
| | 9Q. (Whirlwind-license) | 9 cyl. rad. | 250- 310 | 2000 | 5 | 127 × 140 | 272 | 1.115 | — | — | 1.194 |
| ISOTTA-FRASCHINI ... ... | Asso 80.R (geared) ... | 6 cyl. line | 100- 120 | 2000 | 5 | 100 × 140 | 134 | 1.36 | 0.54 | 0.78 | — |
| | Asso-Caccia ... ... | 12 cyl. vee | 450- 495 | 2000 | 5.4 | 125 × 140 | 315 | 1.646 | 0.7 | 0.84 | — |
| | As o 500.R (geared) ... | 12 cyl. vee | 510- 546 | 2000 | 5.5 | 140 × 150 | 460 | 1.864 | 0.81 | 0.94 | — |
| | Asso 750 ... ... ... | 18 cyl. "w" | 800- 910 | 1450 | 5.3 | 150 × 180 | 810 | 2.191 | 1.06 | 1.115 | — |
| LORRAINE ... ... ... | Ecole ... ... ... | 5 cyl. rad. | 100- 110 | 1350 | 5 | 125 × 140 | 156.35 | 0.97 | — | — | 1.125 |
| | (Un-named) ... ... | 5 cyl. rad. | 120- 150 | 1700 | 5 | 130 × 140 | 161 | 0.97 | — | — | 1.125 |
| | Mizar ... ... ... | 7 cyl. rad. | 240- 283 | 1800 | 5 | 140 × 150 | 265 | 1.29 | — | — | 1.24 |
| | Algol ... ... ... | 9 cyl. rad. | 300- 370 | 1800 | 5 | 140 × 150 | 296.24 | 1.19 | — | — | 1.254 |
| | Antarès ... ... ... | 14 cyl. rad. | 500- 595 | 1900 | 5 | 140 × 150 | 423 | 1.42 | — | — | 1.24 |
| | (Un-named) ... ... | 12 cyl. "w" | 450- 486 | 1850 | 6 | 120 × 180 | 372.87 | 1.375 | 1.21 | 1.105 | — |
| | Pétrel ... ... ... | 12 cyl. vee | 500- 675 | 2200 | 6 | 145 × 145 | 372 | 1.36 | 0.73 | 0.92 | — |
| | Courlis ... ... ... | 12 cyl. "w" | 600- 660 | 2000 | 6 | 145 × 160 | 423.3 | 1.657 | 1.14 | 1.06 | — |
| | (Un-named) ... ... | 18 cyl. "w" | 650- 720 | 2000 | 6 | 120 × 180 | 584.3 | 2.12 | 0.92 | 1.096 | — |
| | Orion ... ... ... | 18 cyl. "w" | 700- 870 | 2100 | 6 | 125 × 180 | 568.7 | 2.1 | 0.926 | 1.105 | — |
| | Eider ... ... ... | 12 cyl. vee | 900-1050 | 2200 | 6 | 170 × 165 | 580 | 1.87 | 0.75 | 0.96 | — |
| MICHEL ... ... ... | A.M.7 ... ... ... | 6 cyl. line | 200 | 1700 | 5.5 | 127.2 × 178 | — | — | — | — | — |
| | A.M.14 ... ... ... | 4 cyl. line | 100- 120 | 1600 | 5.1 | 125 × 150 | 155 | — | — | — | — |
| | A.M.15 ... ... ... | 4 cyl. line | 110- 130 | 1700 | 5.1 | 125 × 150 | 155 | — | — | — | — |
| RENAULT ... ... ... | (No type number) ... | 4 cyl. line | 95- 100 | 2000 | 5.2 | 115 × 140 | 138 | 1.387 | 0.54 | 0.92 | — |
| | (No type number) ... | 7 cyl. rad. | 100- 120 | 2000 | 5.2 | 100 × 120 | 140 | — | — | — | — |
| | (No type number) ... | 9 cyl. rad. | 250- 270 | 1820 | — | 125 × 150 | 265 | 0.94 | — | — | 1.22 |
| | 12.Jc ... ... ... | 12 cyl. vee | 500- 522 | 2100 | 5 | 125 × 170 | 335 | 1.128 | 0.95 | 1.068 | — |
| | 12.Kl ... ... ... | 12 cyl. vee | 550- 600 | 1800 | — | 134 × 180 | 480 | — | — | — | — |
| | 18.Ja ... ... ... | 18 cyl. "w" | 750- 850 | 2100 | 5 | 125 × 170 | 630 | 2.1 | 0.98 | 1.123 | — |
| ROLLS-ROYCE ... ... | "F" (geared) ... | 12 cyl. vee | 490- 560 | 2250 | — | 127 × 140 | 392 | — | — | — | — |
| | "H" (geared) ... | 12 cyl. vee | 825- 920 | 2000 | — | 152 × 168 | 662.2 | — | — | — | — |
| S.F.F.A. ... ... ... | B ... ... ... | 3 cyl. rad. | 45 | 1450 | 4.75 | 105 × 125 | 75 | — | — | — | — |
| | A ... ... ... | 7 cyl. rad. | 100 | 1450 | 5.4 | 105 × 125 | 135 | — | — | — | — |
| SALMSON ... ... ... | 9AD ... ... ... | 9 cyl. rad. | 40 | 2000 | 5.6 | 70 × 86 | 70 | 0.64 | — | — | 0.63 |
| | 7AC ... ... ... | 7 cyl. rad. | 95 | 1800 | 5—5.4 | 100 × 130 | 130 | 0.82 | — | — | 0.94 |
| | 9AC ... ... ... | 9 cyl. rad. | 120 | 1800 | 5—5.4 | 100 × 130 | 170 | 0.9 | — | — | 0.95 |
| | 9NCT ... ... ... | 9 cyl. rad. | 150 | 1800 | 5.1 | 100 × 140 | 140 | — | — | — | — |
| | 9AB ... ... ... | 9 cyl. rad. | 230 | 1700 | 5—5.4 | 125 × 170 | 265 | 1.0 | — | — | 1.18 |
| | 18AB ... ... ... | 18 cyl. rad. | 500 | 1700 | 5.2 | 125 × 180 | 450 | 1.39 | — | — | 1.22 |
| SIEMENS ... ... ... | Sh. 13a ... ... ... | 5 cyl. rad. | 75- 88 | 1850 | — | 105 × 120 | 105.1 | 0.843 | — | — | 0.996 |
| | Sh. 20 (geared) ... | 9 cyl. rad. | 500- 600 | 1900 | — | 154 × 188 | 475 | 1.423 | — | — | 1.458 |
| WALTER ... ... ... | Vega ... ... ... | 5 cyl. rad. | 85- 90 | 1750 | 5,15 | 105 × 120 | 104 | — | — | — | 1.01 |
| | Venus ... ... ... | 7 cyl. rad. | 110- 120 | 1750 | 5.15 | 105 × 120 | 126 | — | — | — | 1.01 |
| | Mars ... ... ... | 9 cyl. rad. | 145- 160 | 1750 | 5.15 | 105 × 120 | 160 | — | — | — | 1.06 |
| | Regulus ... ... ... | 5 cyl. rad. | 185- 220 | 1800 | 5.2/5.7 | 135 × 160 | 191 | 1.104 | — | — | 1.185 |
| | Castor ... ... ... | 7 cyl. rad. | 240- 350 | 1750 | 6 | 135 × 170 | 250 | — | — | — | — |
| | Atlas ... ... .. | 9 cyl. rad. | 600- 700 | 1900 | 5.3 | 165 × 180 | 480 | 1.45 | — | — | 1.2 |

* At 4,000m. † At 3,350m.

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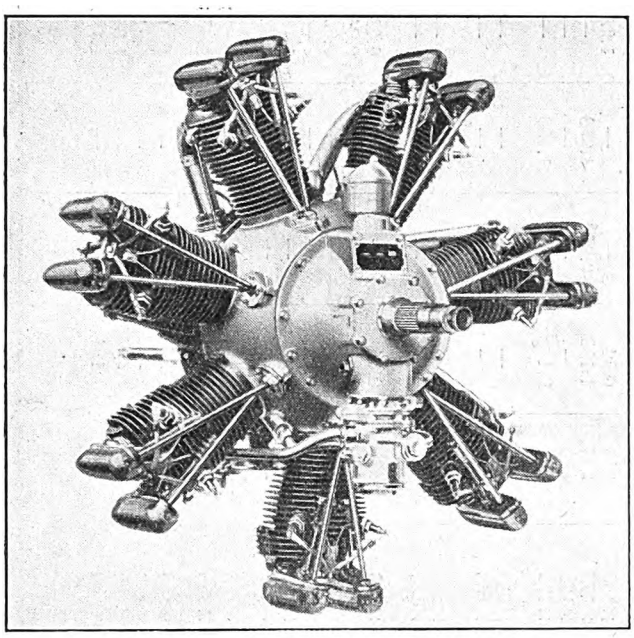
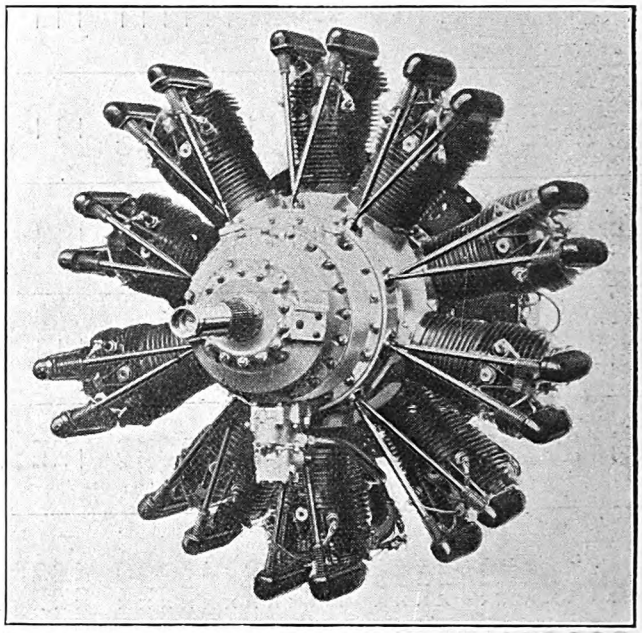
# AERO-ENGINES AT THE PARIS SHOW.



The Armstrong Siddeley 140 h.p. 7-cyl. Genet-Major engine.



The 350 h.p. Armstrong Siddeley Double-Mongoose engine.

**ALFA-ROMEO (S.A.I. Ing. Nicola Romeo and C.).** **Stand 32.**

This well-known manufacturer of high-speed Italian automobiles holds the licence to build the Bristol Jupiter and the Armstrong Siddeley Lynx in Italy. The company also builds a 225/245 h.p. nine-cylinder radial of its own design but this engine was not exhibited. The firm only showed parts in various stages of construction of Jupiter and Lynx engines.

**ARMSTRONG SIDDELEY (Armstrong Siddeley Motors Ltd.).** **Stand 1.**

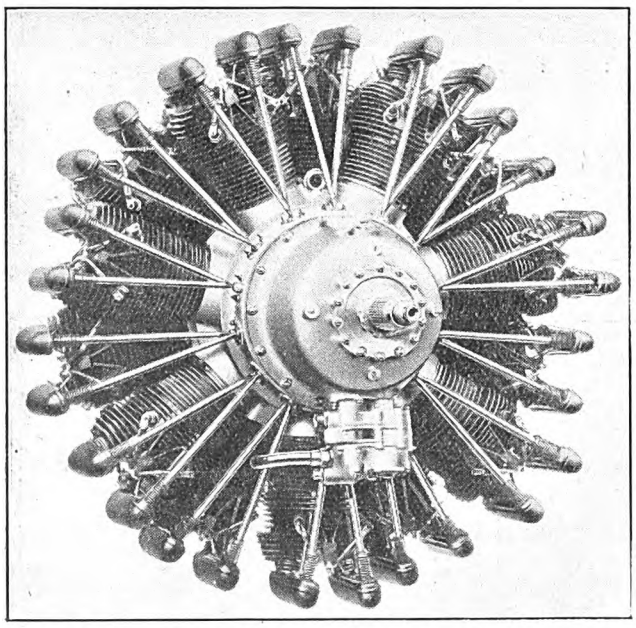
Armstrong Siddeley Motors Ltd. show nine engines of their famous series of air-cooled radials. In order of ascending power the exhibited engines are the 80/88 h.p., Genet, the 100/110 h.p. Genet-Major, the 140/155 h.p. seven-cylinder Genet-Major, the 150/165 h.p. Mongoose, the 215/235 h.p. Lynx, the 340/350 h.p. Double Mongoose, the 450/500 h.p. Jaguar, the 500/550 h.p. Panther and the 700/800 h.p. Leopard.

Of these engines the seven-cylinder Genet-Major and the ten-cylinder Double Mongoose are new and are being exhibited in public for the first time.

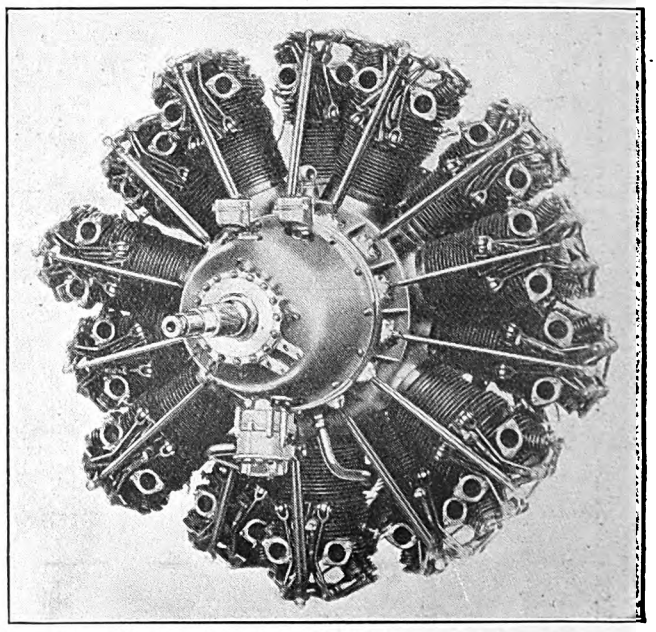
The seven-cylinder Genet-Major, as its name implies, is a seven-cylinder version of the Genet-Major, and it thus maintains the economic policy of the Armstrong Siddeley policy of producing engines having the major components interchangeable with other engines in the series.

Similarly the ten-cylinder Double Mongoose incorporates all the major components of the standard Mongoose engine. Mongoose cylinders, cylinder heads and valve gear are interchangeable with those of the Lynx and Jaguar engines, so that with the introduction of the Double Mongoose there is now an Armstrong Siddeley range of engines which include the 150 h.p. Mongoose, the 215 h.p. Lynx, the 350 h.p. Double Mongoose, and the 400 h.p. Jaguar, all of which have cylinders and many other components of the same size and type. This high degree of interchangeability presents many advantages from the point of view of service and maintenance. This feature is also obtained with the previously-mentioned five and seven-cylinder Genet-Majors and in a similar way the main components of the Lynx-Major, which is not being exhibited, are interchangeable with those of the Panther.

All Armstrong Siddeley engines except the Lynx-Major the two Mongoose and the three Genets, may be fitted with reduction gears, the Panther, the Jaguar and the Lynx may be fitted with the Armstrong Siddeley supercharger and the Panther and the Lynx-Major may be fitted with a geared fan which gives a partial supercharge at a comparatively low altitude. With all these permutations and combinations there are available nineteen different Armstrong



The 500 h.p. Armstrong Siddeley Panther engine.



The 800 h.p. Armstrong Siddeley Leopard engine.

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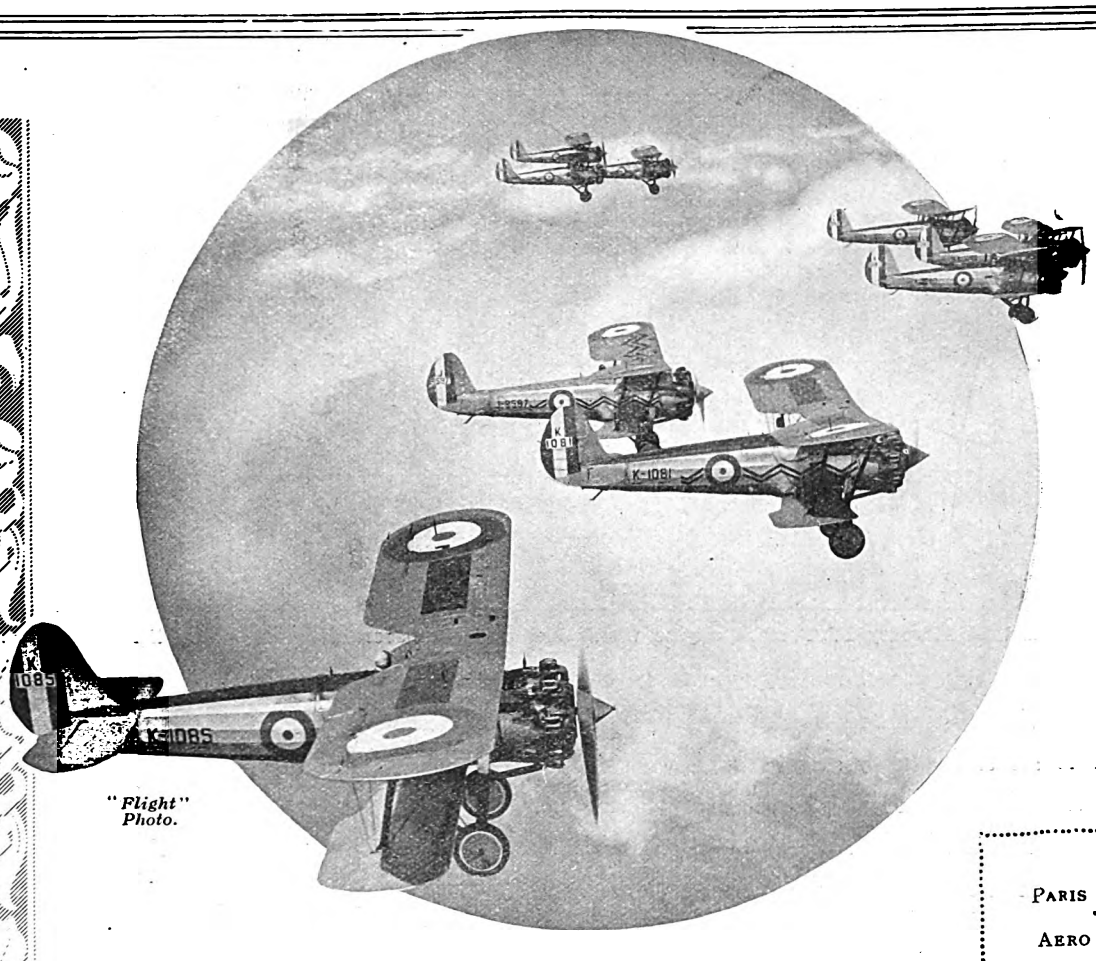


"Flight" Photo.

PARIS AERO EXHIBITION, STAND No. 1, GALLERY K.

The "Bristol"

# BULLDOG

## ALL-STEEL SINGLE-SEATER FIGHTER

***has been supplied as equipment for the Air Forces of nine different nations***

*Designed and Manufactured by:*

THE BRISTOL AEROPLANE CO. LTD.
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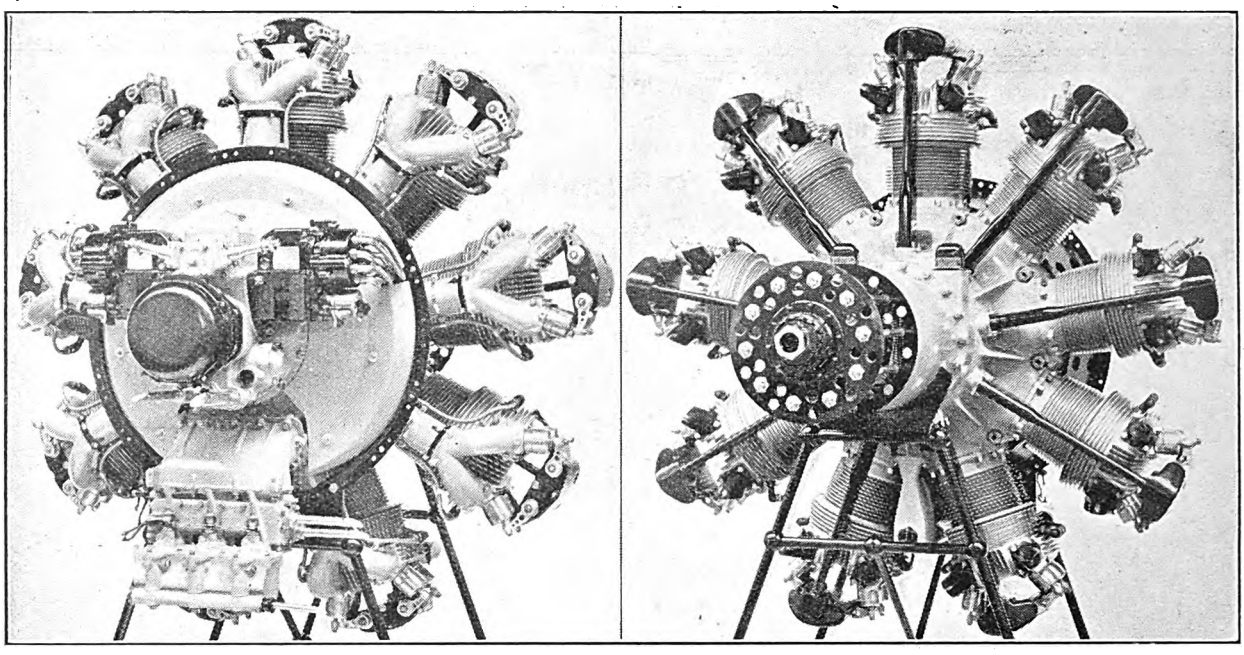


**The Bristol Mercury IV.A Scout engine which has a smaller overall diameter than the Mercury V.A.**

Siddeley engines with powers ranging from 80 to 800 suitable for any possible purpose that can be imagined.

There are many patented features in this range. Among them may be noted the simple method of attaching the cylinder to the crankcase by screwing it into an adaptor in the case and wedging it by a clamping ring with a single screw. The cylinder head is attached to the cylinder barrel by being heated and screwed onto the barrel, where it is finally locked by a ring which forms a radiating fin. Another special feature is the incorporation in the induction system of a mixing fan, which feature is now being largely copied by other aero-engine manufacturers.

The Armstrong Siddeley range shown at Paris present a very formidable array of efficient power-plants, the good qualities of which are fully realised all over the World.

**B.M.W. (Bayerische Motoren Werke A.G.). Stand 13.**

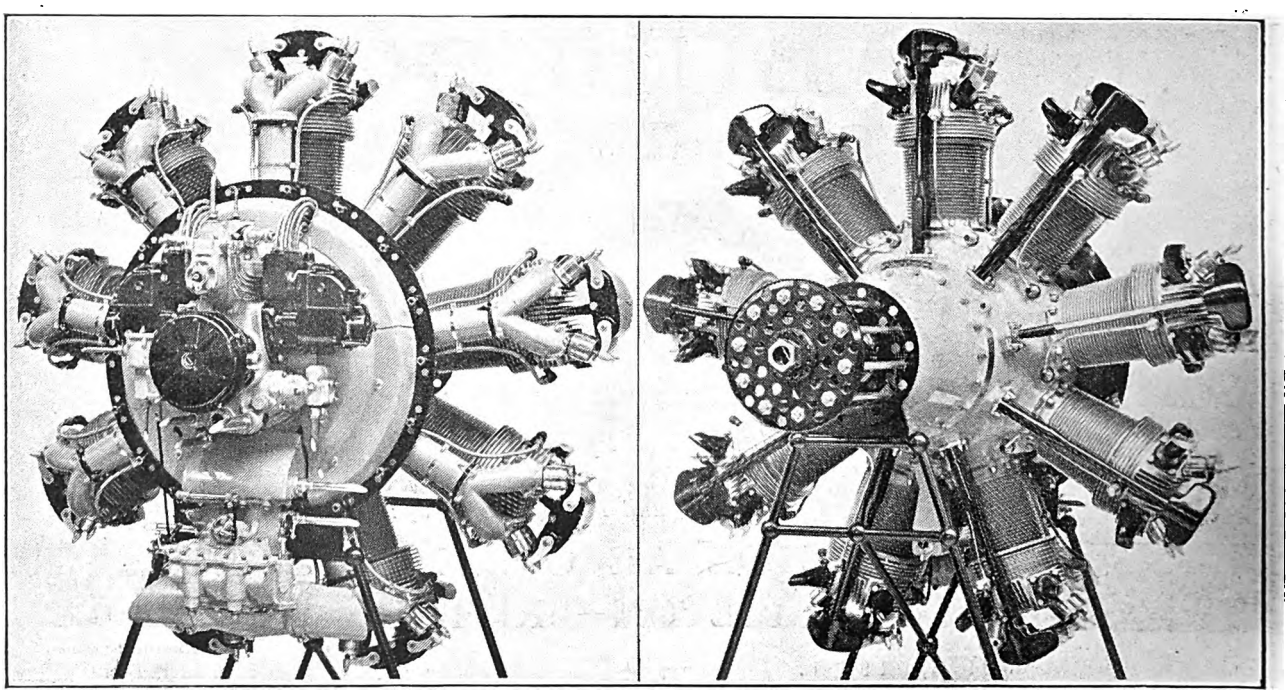
The B.M.W. company shows three engines, the 450/480 h.p. Wasp and the 525/575 h.p. Hornet nine-cylinder radial air-cooled engines built under licence from the Pratt and Whitney Aircraft Co., of Hartford, Conn., U.S.A., and the 600/770 h.p. B.M.W. VIIA.U. twelve-cylinder water-cooled Vee geared engine.

The VIIA.U. is a double version of the six-cylinder B.M.W. Va and the resultant engine is one of extreme compactness. It differs from the earlier twelve-cylinder type VI in that the ignition gear has been removed to the front end of the crankcase which greatly assists in reducing the overall dimensions of the engine. The exhibited model is fitted with the Farman reduction gear, the licence for the construction of which, in Germany, is held by the B.M.W. company.

**BRISTOL (The Bristol Aeroplane Co. Ltd.). Stand 28.**

The Bristol company shows three engines, the Jupiter IX.F geared engine completely sectioned and working, and two versions of the new Mercury series of engines, the Mercury IV.A and the Mercury V.A. The former is a high-altitude service type engine and the latter a general purpose or commercial type. The Mercury IV.A has cylinders of one inch less stroke, and consequently a smaller overall diameter, a smaller reduction gear, new enclosed and more compact overhead rocker gear, all of which are features which will assist in the installation of this engine in single-seat fighter aircraft of the "intercepter" class.

The new Mercury series, which includes five engines, one of which has been designed specially for use as a pusher engine, and four of which may be supplied with two standard gear ratios, has been produced after a long period of development work. Among the improvements which have been incorporated in the engines are the provision of gas starting, together with inertia starter of the hand or electrically-energised types, or hand turning gear; engine driven petrol pump unit with built-in relief valve; twin gun interrupter gear at the rear of the engine; automatic ignition control



**The Bristol Mercury V.A general purpose or commercial engine.**

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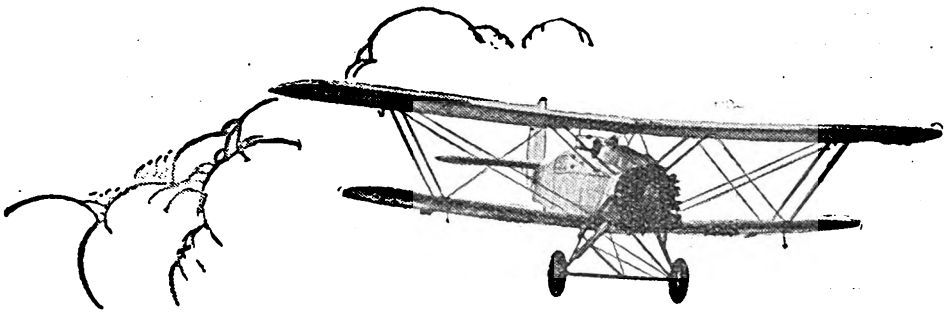


PARIS
AERO SHOW
*Nov. 28 – Dec. 14*
STAND
**24**
GRAND AISLE

*Applications of*

# The ATLAS

THE Armstrong Whitworth Steel Atlas fitted with Armstrong Siddeley Jaguar engine is the standard two-seater aircraft for Army co-operation. It is also used for :—

1. Artillery observation
2. Photography
3. Bombing
4. Picking up messages
5. Reconnaissance
6. Advanced training.

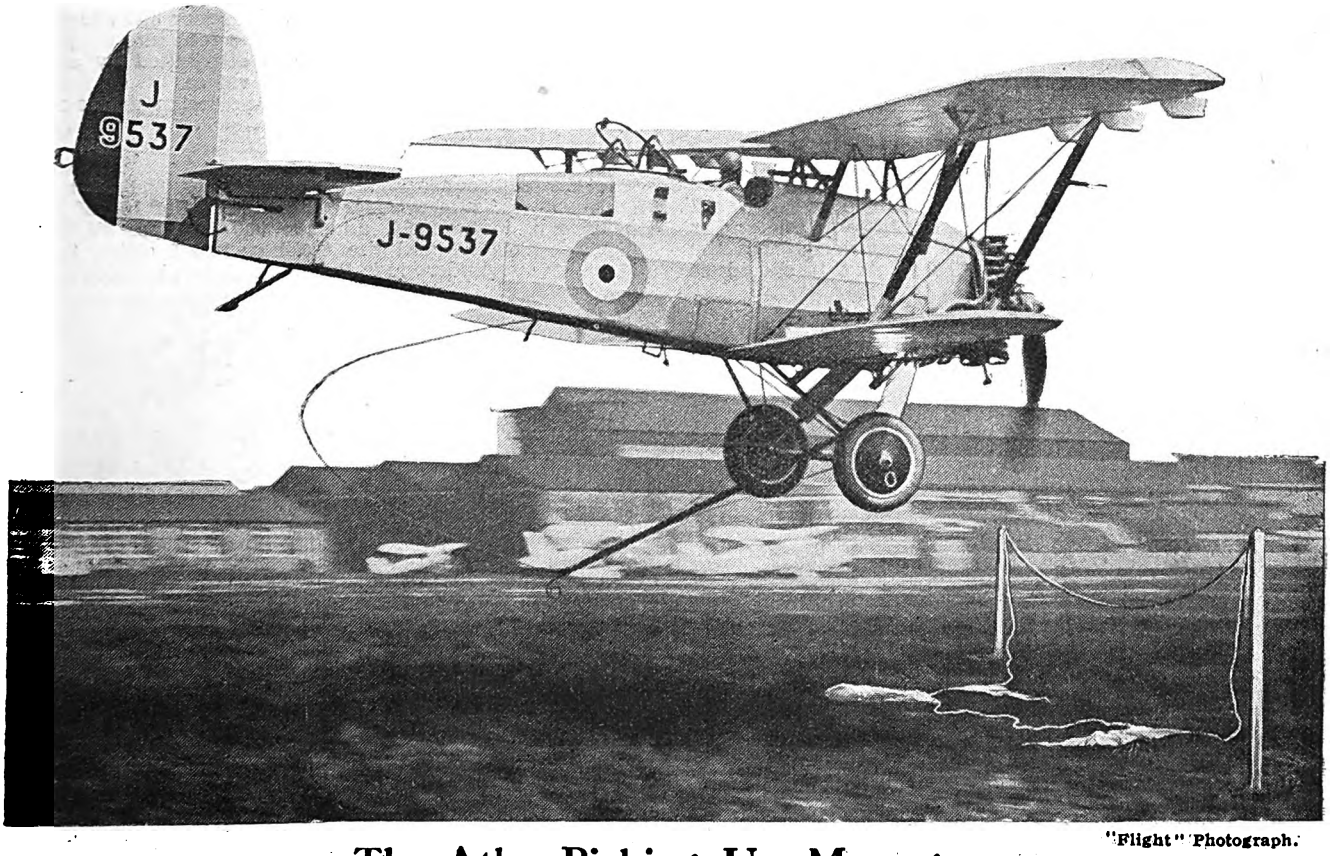
The Atlas aircraft is produced in the best equipped aircraft factory in the British Empire.

SIR W. G.

# ARMSTRONG WHITWORTH

AIRCRAFT LIMITED

**Works and Aerodrome: Whitley, Coventry. London : 10, Old Bond Street, W.1.**




"Flight" Photograph.

The Atlas Picking Up Messages.



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to the magnetos and automatic boost control. In addition, subsidiary drives are provided for oil centrifuger, electrical generator unit, etc.

As it was impossible to incorporate all these auxiliary components on the Jupiter type of back cover, the method of mounting of the Mercury engine has been entirely re-designed. The Mercury engines will be provided with a conical mounting which is secured to the aeroplane by eighteen bolts, incorporating rubber buffer shock-absorbing fitments.

Although these are the main external modifications, other important features of these engines are the unit system of construction adopted with the interchangeability of the main components between the different models, the inclusion of a forged reduction gear casing, a much lighter reduction gear saving some 40 lbs. in weight, and a lighter enclosed rocker gear offering reduced drag.

The general design still retains the main general features of the World-famous Jupiter which is undoubtedly the most used aero-engine in the World. The new Mercury series has successfully completed the Air Ministry 100-hour type test and extensive flight testing has been done in various types of aircraft so that these engines may be regarded as being on the threshold of a career which may be expected to equal, if not surpass, the magnificent reputation of the Jupiter.

**CHAISE (Moteurs d'Aviation). Stand 35.**

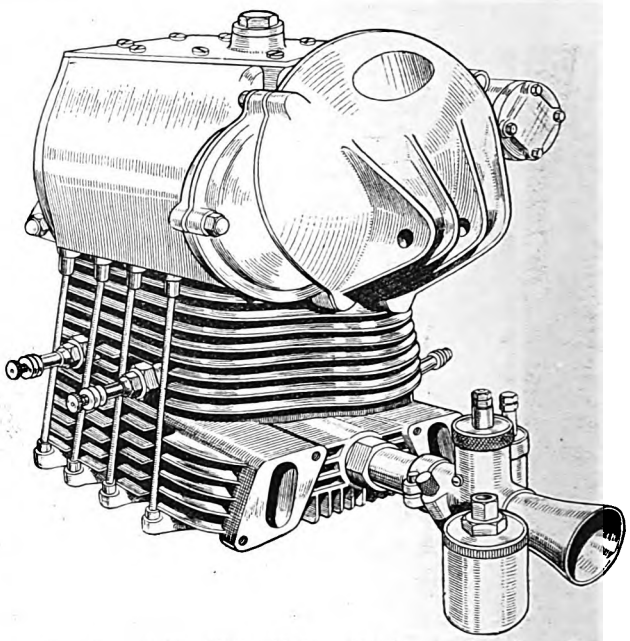
This firm, which is a new comer to the French aero-engine industry, shows two engines, one a minute 12 h.p. and the other a 100 h.p. light aeroplane engine, both of which are built along the same lines and are of the inverted staggered Vee type.

The larger engine, which is known as the AV.2, is the only one that is worth consideration as an aeroplane engine, the smaller one being advertised as an auxiliary power-plant for gliders, which is nonsense—because when an engine is fitted a machine ceases to be a glider.

The cylinders of this engine are of the "hanging" type, are staggered one with the other and each side pair is set at a slight Vee angle to the other. The result is a very short engine and each staggered Vee drives one of the two throws of the crankshaft.

The bottom half of the crankcase and the cylinders are cast in one and the aluminium cylinder heads are held on by four short bolts. The top half or cover of the crankcase is of sheet duralumin and it is provided with four windows through which it is possible to examine the interior of the crankcase. There is one inlet and one exhaust valve per cylinder and these are operated by "underhead" rockers and push rods, four on each side of the engine, off two camshafts which are driven by gearing from the front end of the crankshaft. A single carburetter is mounted below the engine and feeds direct to two manifolds between the cylinder heads. Two magnetos are mounted above the camshaft casings, one on each side of the engine, and are driven off the camshaft gearing. Lubrication is of the wet sump type and the bottom half of the crankcase, which is suitably arranged with baffles, has a capacity for 7-8 litres of oil.

The total length of the engine is 99 m/m., the distance between bearer centres is 468 m/m. and the width overall is 590 m/m. It is quite an interesting little engine and is made by a firm which has had long experience with the manufacture of motor-cycle engines so that it should be well made and quite reliable. The price complete with magnetos, sparking plugs and carburetter is 25,000 francs, or roughly £200.



**A drawing of the little 12 h.p. Chaise engine for ultra-light aeroplanes.**

**ELIZALDE (Elizalde S.A.). Stand 15 bis. Upper Gallery.**

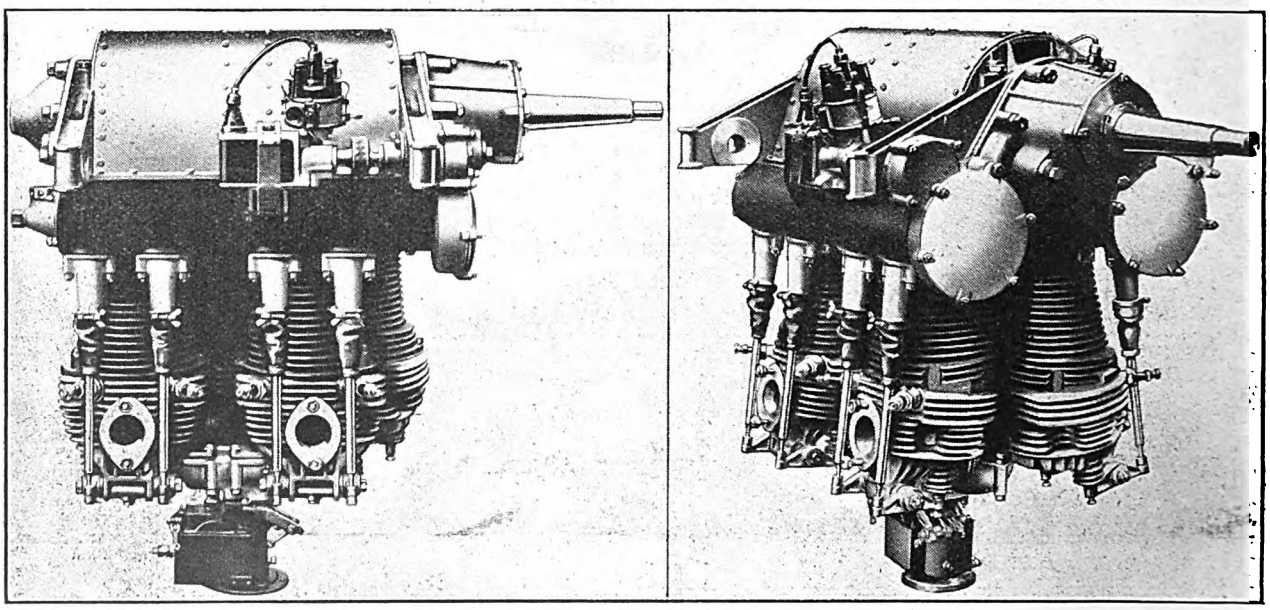
Elizalde S.A. is a well-known Spanish builder of automobiles and it also holds the licence to build Lorraine engines in Spain. It also makes three radial air-cooled engines of its own design, known as the 165 h.p. Dragon V, the 320 h.p. Dragon VII, and the 525 h.p. Superdragon.

They are five, seven and nine cylinder engines respectively and are all of a similar general design. They have steel cylinders, aluminium alloy cylinder-heads, a two-piece crankshaft, aluminium alloy crankcase in two halves split on the cylinder centre-line and overhead valve gear with enclosed push-rods and rocker gear. The front cover of the crankcase houses the cam disc and the timing gear. The back cover carries the auxiliary gears and the distribution fan case. The Dragon V has but one carburetter but the other two engines have two. The carburetters feed into an annular chamber whence the mixture is distributed by a fan through tangential pipes to the inlet valves.

The three engines are of up-to-date design and appear to be very well made.

**FARMAN (Société Henri et Maurice). Stand 5.**

The Farman company shows five engines, the 7E.A and 9E.A seven- and nine-cylinder geared radials of 165/200 and 210/260 h.p. respectively, and the 350/400 h.p. 8V.I, the 550/650 h.p. 12W.I and the 600 h.p. 18W.I eight, twelve and eighteen-cylinder inverted supercharged water-cooled



**Side and three-quarter front views of the 100 h.p. Chaise AV.2 inverted four-cylinder Vee engine.**

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PARIS
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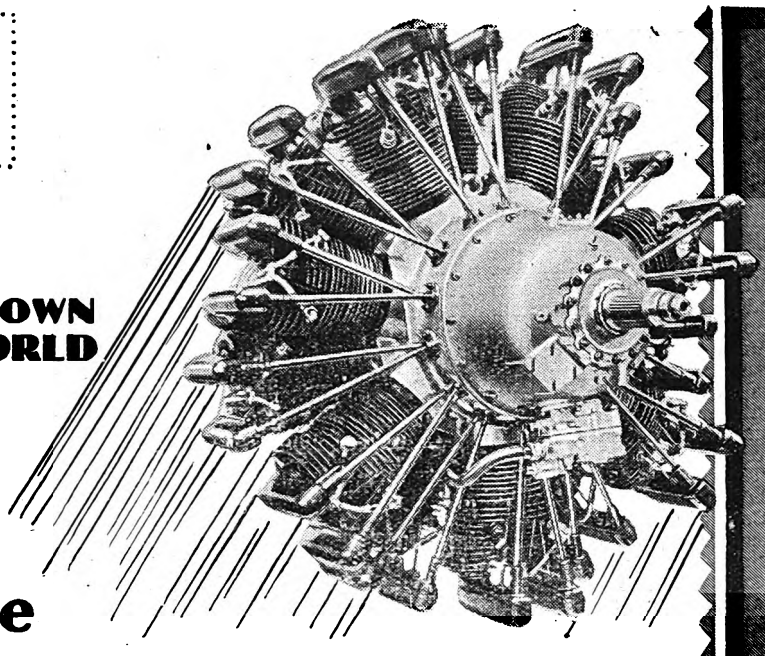
*Nov. 28—Dec. 14*
STAND 1 GALLERY A



**FLOWN AND KNOWN ALL OVER THE WORLD**

# The ARMSTRONG SIDDELEY

## JAGUAR MAJOR (GEARED)

THIS geared engine is an improved and more powerful edition of the world famous Jaguar.

Its outstanding qualities are its smooth running and total absence of vibration, ease of installation, simple maintenance and economy of running.

Its performance is equal if not superior to that of any watercooled engine of the same power.

Two types are available. The normal one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the fully supercharged type rated at 510 h.p. at 11,500 feet.

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engines, the first two of Vee formation and the last one of the "broad-arrow" type.

The three Farman water-cooled engines are all of similar construction. Each row of four or six cylinders consists of an Alpax block casting into which the steel liners are pressed from the inner end. The block casting is complete with cylinder head, valve ports, etc. There are four valves per cylinder driven by a single camshaft, which is enclosed in a casing bolted to each cylinder block. All three engines are fitted with Rateau blowers mounted at the back and each engine is fitted with the well-known Farman reduction gear.

The nine-cylinder Farman radial type 9E.A engine was exhibited at the last Paris Salon. It has steel cylinders screwed into cast aluminium heads which have one inlet and one exhaust valve operated by push-rods. The rockers and push-rods are enclosed. The crankcase is in four parts. The front cover carries the Farman bevel-type reduction gear and the twin coil ignition. The front half of the case carries the timing gear and the rear half houses a gas distributor fan which revolves at four times the crankshaft speed. The back cover supports the generator, oil pumps and starter. A single carburetter supplies the mixture to the fan chamber.

The 7E.A seven-cylinder radial is very similar to the 9E.A but has cylinders of 15 m/m. greater stroke.

Several examples of the Farman gear are shown, including one fully sectioned and others suitable for engines ranging from 250 to 700 h.p. A complete gear for a Jupiter engine with a built-in Farman electric starter on top of the casing is also shown.

**FIAT (Societa Anonima).** **Stand 22.**

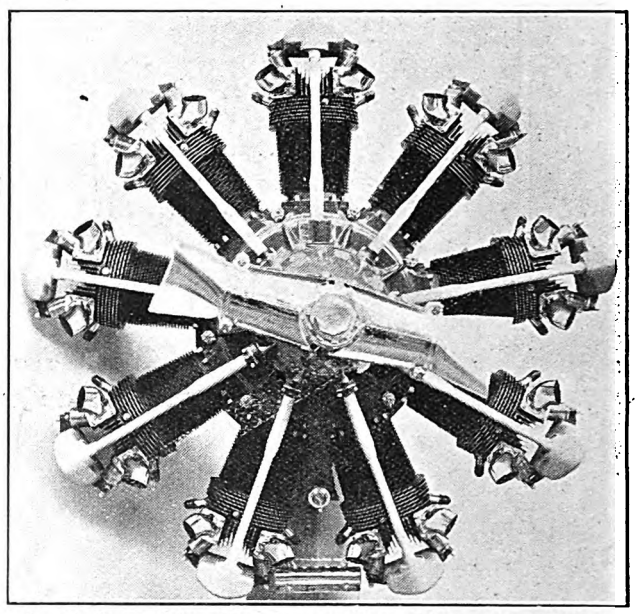
The Fiat company shows nine engines, eight of the water-cooled Vee type and one of the radial air-cooled type. This comprises their full range and all of the engines are fairly well known.

The exhibited engines are the 450 h.p. A.20, the 550 h.p. A.22R geared, the 570 h.p. A.22T, the 700 h.p. A.24, the 700 h.p. A.24R geared, the 950 h.p. A.25, the 1,000 h.p. A.S.3, the 1,000 h.p. A.S.5 and the 90 h.p. A.50, the last mentioned being the sole radial air-cooled engine produced by the Fiat company.

All the Fiat water-cooled engines are of the 60-degree 12-cylinder Vee type and are developments of the original 400 h.p A.20, which again was based on the Curtiss D.12 engine. The A.S.3 and the A.S.5 are racing engines, which were built for the 1927 and 1929 Schneider Trophy contests. The former was used in the Macchi seaplane with which Major de Bernardi established the World's Speed Record in 1927. The A.S.5 is a refinement of the A.S.3, and the most noticeable external detail improvement is the fashioning of the airscrew-shaft casing and the front portion of the bottom half of the crankcase to conform to the ultimate lines of the nose of the machine in which it is to be installed.

The A.22T engine, in the Savoia S.64 bis monoplane, holds the World's duration record with 67¼ hours.

The A.50 is a seven-cylinder radial which has put up a number of outstanding performances, mostly in Fiat light aircraft. These include the World's Height and Duration records for light aeroplanes and flights from Italy to Japan, Italian Somaliland and South Africa.



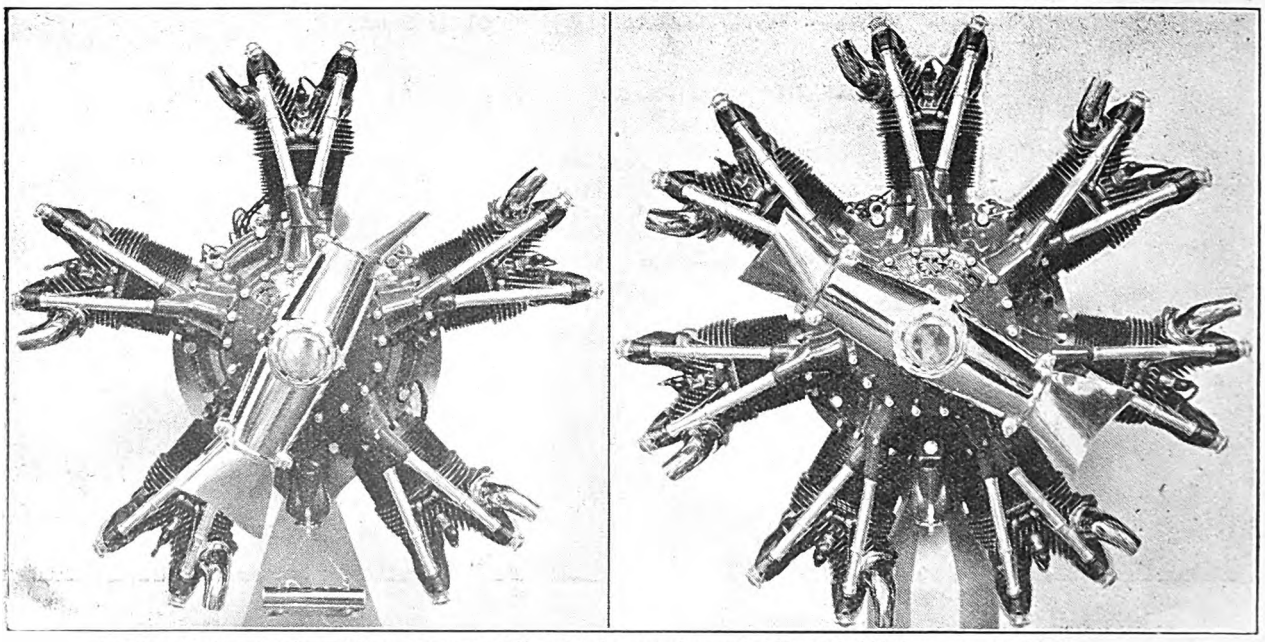
**The Gnôme-Rhône Mercure engine, which gives 525 h.p. at 4,000 metres.**

**GNOME-ET-RHONE (Société des Moteurs).** **Stand 7.**

The Gnôme-Rhône company shows five engines, the 240/255 h.p. Titan, the 420/575 h.p. Jupiter VII with supercharger and shown in sectioned form, the 530/575 h.p. Mercure geared and supercharged, and two new Gnôme-Rhône engines, the 240/285 h.p. Titan K and the 300/370 h.p. Titan-Major.

The Titan, Jupiter VII and the Mercure are all based on Bristol practice. The Titan and Jupiter have a very high reputation on the Continent, the former in commercial use on the Cidna, Sabena and K.L.M. services and the latter in both military and commercial fields. The Jupiter VII supercharged has been produced to meet the most recent demands for performance at high altitudes and several examples have been installed in experimental types on the Continent. Similarly, the Mercure has been introduced in France to meet the latest military requirements. It is developed from the Jupiter engine but has new cylinder-heads and is fitted with a supercharger which permits the engine to give an output of 525 h.p. at 4,000 m. on a total weight of only 410 kgs.

The Titan K and the Titan-Major are five- and seven-cylinder radials, which use the same cylinders, cylinder-heads and other general components. The cylinder dimensions are the same as those of the standard Titan, but an entirely new type of cylinder-head has been produced with inclined overhead valves, augmented finning for the cylinders and cylinder-heads to give adequate cooling for tractor and pusher installations has been provided, fan distribution for the mixture and enclosed overhead rocker gear and



**The Gnôme-Rhône Titan K and Titan-Major engines of 240 and 300 h.p. respectively.**

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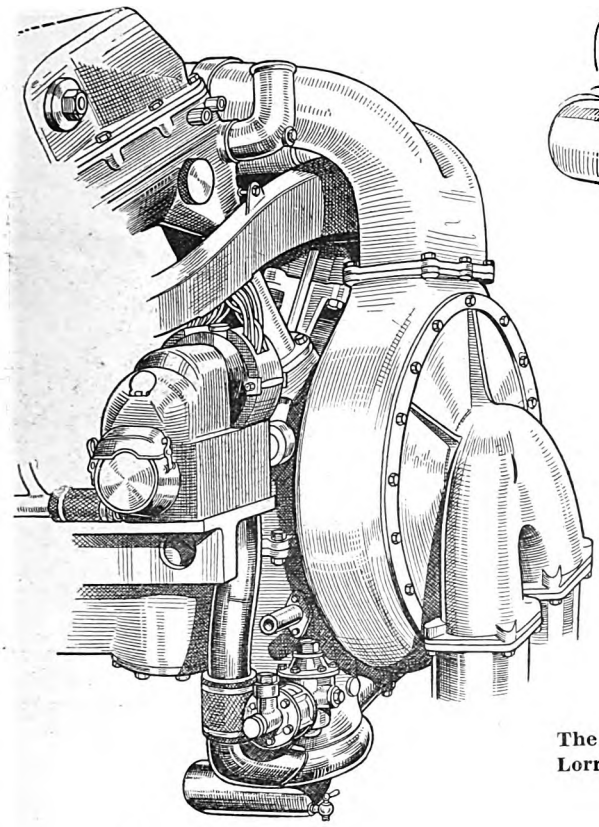
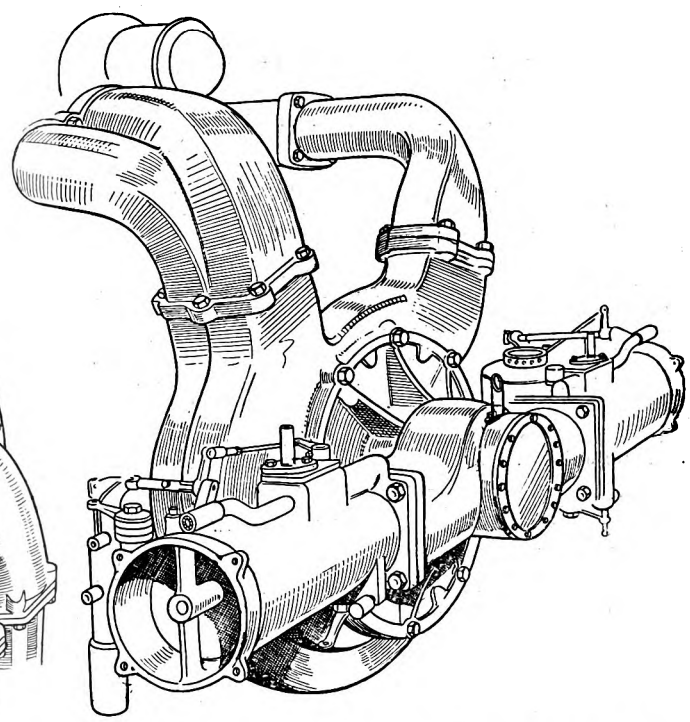
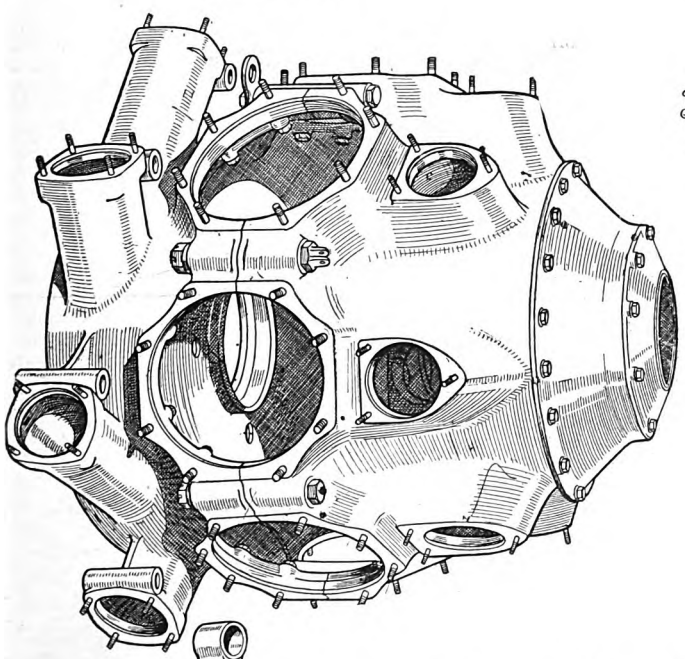
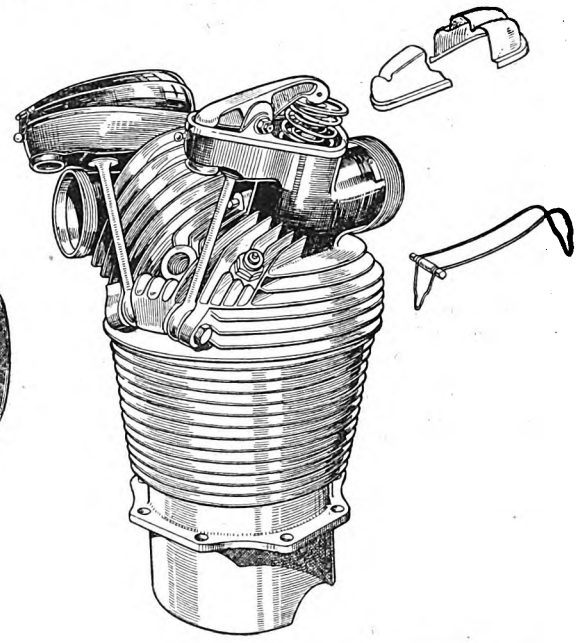
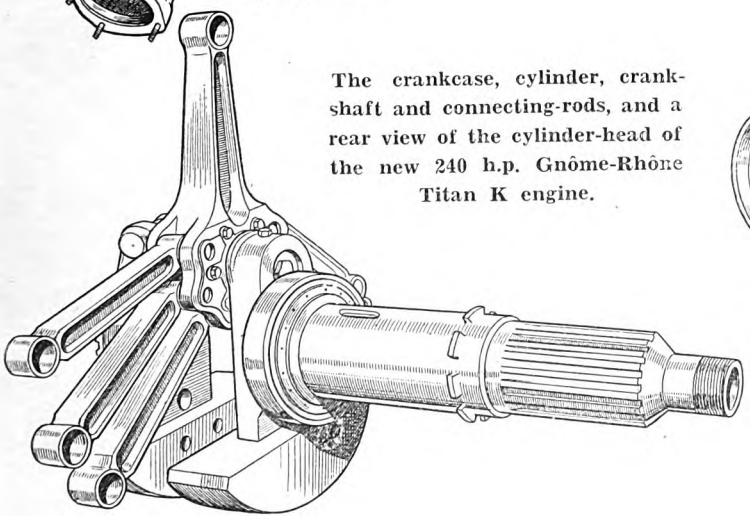


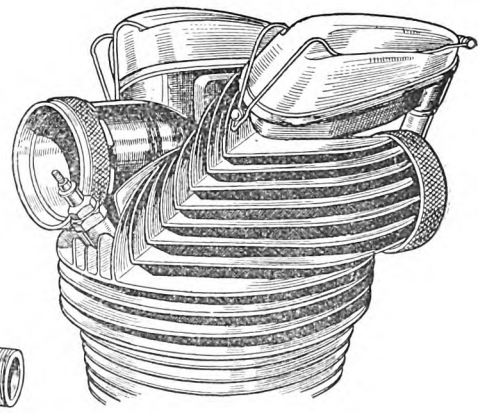


The blower arrangements of (on the left) the new 1,000 h.p. Lorraine Eider 12-cylinder Vee and (on the right) of the 700/880 h.p. Renault 18-cylinder "W" engines.









The crankcase, cylinder, crankshaft and connecting-rods, and a rear view of the cylinder-head of the new 240 h.p. Gnôme-Rhône Titan K engine.

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push-rods and other refinements have been incorporated to bring the engines into line with the latest requirements for engines of this type.

All the Gnôme-Rhône engines are beautifully finished and adequately uphold the reputation of Bristol products on the Continent.

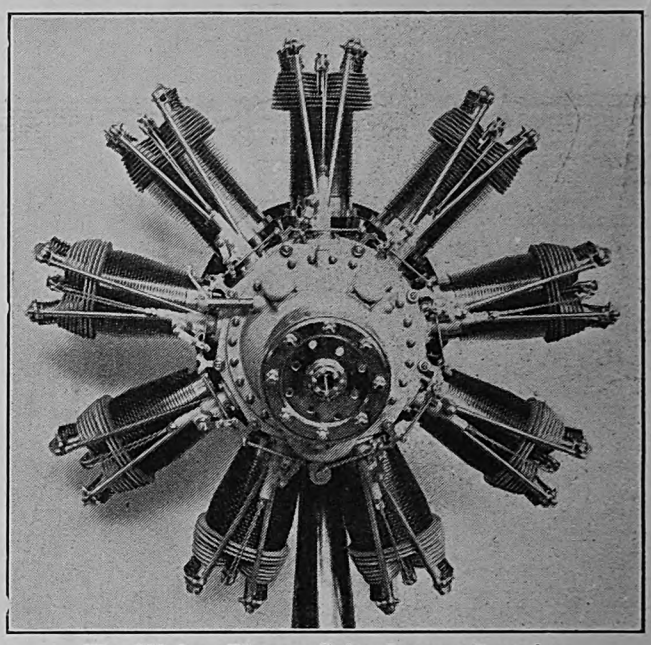
**HISPANO-SUIZA (Société Française). Stand 20.**

Hispano-Suiza shows sixteen engines ranging in power from 100 to 1,000. All are water-cooled with the exception of the 250 h.p. Wright-Hispano, built under licence from the American Wright company, and the 200 h.p. Hispano-Suiza heavy oil radial which is built under licence from M. Clerget, the well-known producer of rotary engines in the earlier days.

The water-cooled range shown include the 100 h.p. 6.Pa six-cylinder-in-line, the 180 h.p. 8.Ad eight-cylinder Vee, the 250 h.p. 6.Mb six-cylinder-in-line, the 300 h.p. 8.Fb eight-cylinder Vee, the 400 h.p. 12.Jb twelve-cylinder Vee, the 500 h.p. 12.Hbr twelve-cylinder Vee geared, the 500 h.p. 12.Gb twelve-cylinder "W," the 600 h.p. 12.Lb twelve-cylinder Vee, the 650 h.p. 12.Nb twelve-cylinder Vee, the 650 h.p. 12.Nbr twelve-cylinder Vee geared and the 1,000 h.p. 18.Sb eighteen-cylinder "W" racing engine.

The most interesting and the only really new engine in this range is the 18.Sb, which was originally produced for the 1929 French Schneider Trophy participation. The three rows of six cylinders, which are similar in size to those of the 650 h.p. Vee engine, are set at angles of 80 degrees to one another, making the engine virtually of an inverted "T" shape. There are three carburetters to each block of six cylinders and these are mounted snugly up against the cylinders so that there is little or no obstruction between the three blocks.

A feature of all new Hispano-Suiza engines is the use of nitrided or nitrogen-treated cylinders, a treatment that considerably enhances their durability. These cylinders are open at both ends, are screwed into the aluminium cylinder block at the top and are held in a stuffing-box at the bottom. With this construction the cooling water is in contact with the cylinder for a considerable part of its length and the stuffing-box at the bottom end allows for expansion. A further advantage of this construction is that it allows of cylinders of greater bore to be placed in the same size cylinder block, thereby permitting an increase in power without an increase in the overall dimensions. Thus an engine of 500/570 h.p. with nitrided cylinders has the same overall dimensions as a normal engine of 400/450 h.p

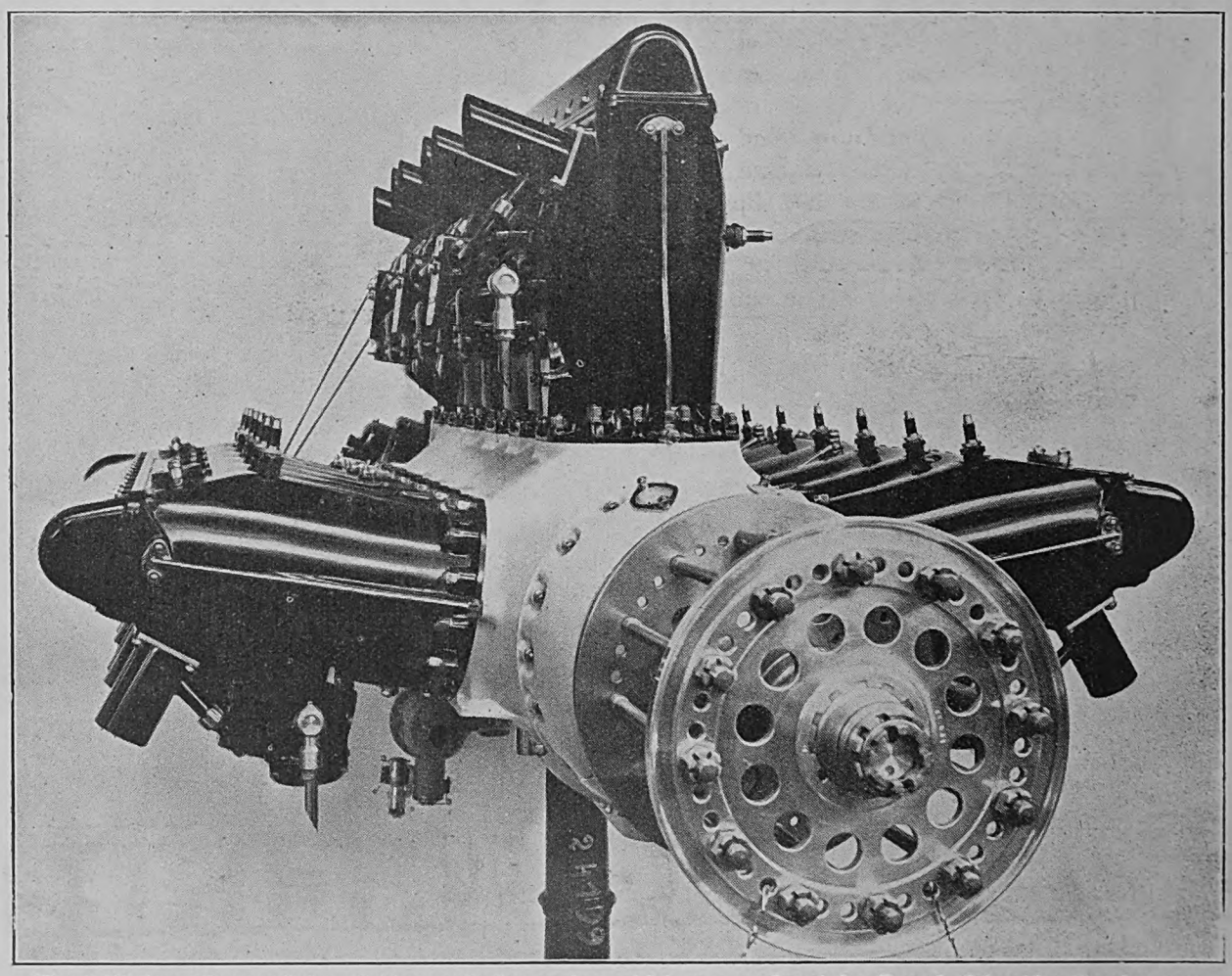


**The 250 h.p. Hispano-Suiza heavy oil engine.**

All engines with nitrided cylinders have a special supplementary lubrication system which permits a pilot to take-off as soon as his engine has been started without any preliminary warming-up.

The 650 h.p. 12.Nb engine is the one that MM. Costes and Bellonte used on their Paris-New York flight, and to celebrate this performance an engine of this type, suitably decorated with tricolour ribbon, forms the centrepiece of the Hispano stand.

Several examples of this particular model have been



**The 1,000 h.p. Hispano-Suiza eighteen-cylinder engine which was produced for French Schneider Trophy participation. This engine has given a maximum output of 1,650 h.p.**

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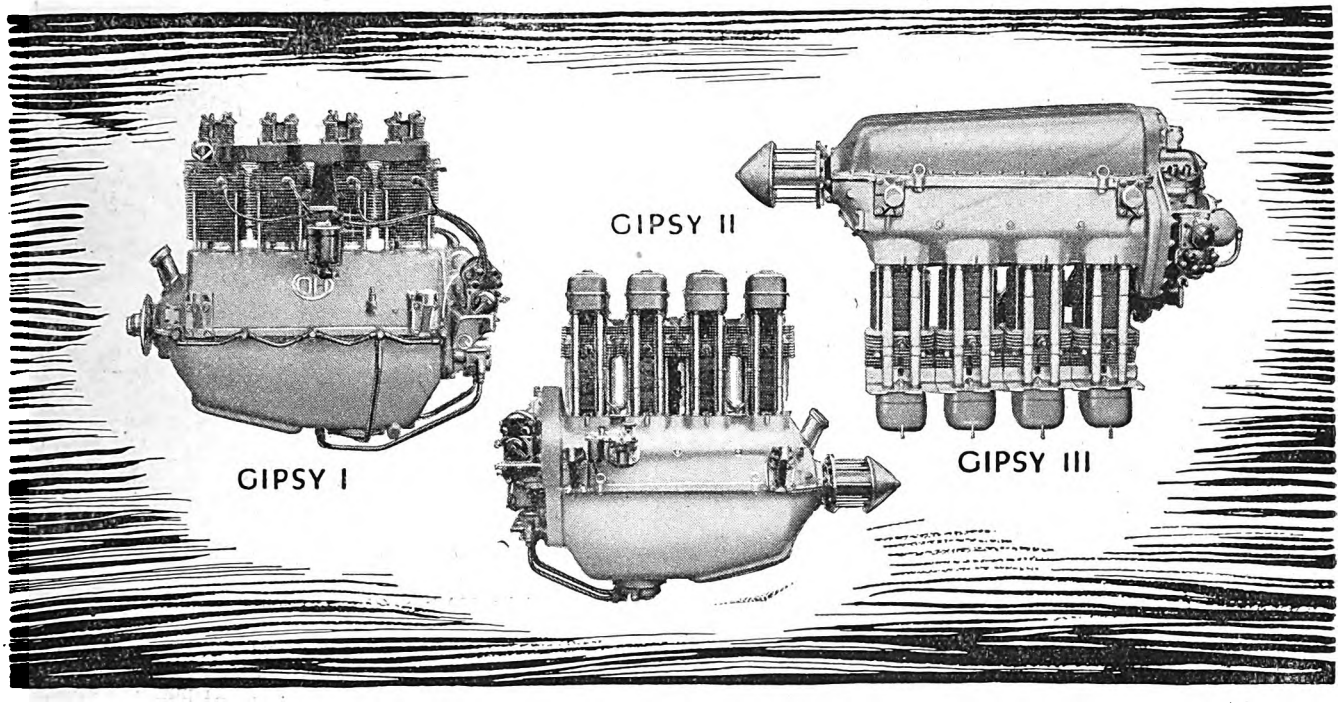


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London to Tangiers and return, non-stop in both directions (Gipsy III).

World's record flight from England to South Africa in 8½ days (Mr. R. F. Caspareuthus—Gipsy III).

World's record flight from England to Australia in 10 days (Wing Commander Kingsford Smith—Gipsy II).

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ordered by the French Air Ministry for installation in the special Schneider Trophy training machines, and for this purpose these engines have had the compression ratio raised from 6 to 10 and the r.p.m. from 2,000 to 2,400. These engines in this state have an output of 1,000 h.p. Similarly, the 1,000 h.p. 18.Sb has given 1,650 h.p. by the same treatment.

The Hispano-Suiza 9.T heavy-oil engine is a nine-cylinder radial which follows closely the smaller 100 h.p. Clerget engine mentioned elsewhere. This engine gives a nominal output of 220 h.p. at 1,800 r.p.m. and weighs 310 kgs.

The Wright-Hispano differs from its American prototype in that it has nitrated cylinders and Solex-Hispano carburetters. This engine, which is known in the U.S.A. as the 300 h.p. Whirlwind-Nine, has been homologated by the *Service Technique* at 250 h.p.

**ISOTTA-FRASCHINI (Fabbrica Automobili). Stand 25.**

This company shows four engines of well-known design. These are the 100/120 h.p. Asso 80.R six-cylinder-in-line air-cooled, the 450/595 h.p. Asso-Caccia twelve-cylinder Vee air-cooled, the 510/546 h.p. Asso 500.R twelve-cylinder Vee water-cooled, and the 800/910 h.p. eighteen-cylinder "W" type water-cooled engines.

The Asso 80.R is a very neat six-cylinder-in-line engine for light aircraft. It has six steel cylinders with separate aluminium heads which are held down by four long bolts passing through to the crankcase. Two camshafts are housed in the top half of the crankcase, one on each side of the cylinders and operate the overhead valves by vertical push-rods. The crankcase is an Electron casting in two sections. Lubrication is of the dry sump type and a double oil pump driven off the port camshaft delivers oil under pressure to all the bearings. Two six-cylinder magnetos are mounted at the back of the engine. A spur reduction gear is fitted which raises the airscrew centre-line above that of the crankshaft.

The Asso-Caccia twelve-cylinder air-cooled Vee engine follows standard Isotta-Fraschini practice except for the cylinders, which are machined from steel forgings with integral cooling fins. Each cylinder has a separate bolted-on aluminium head containing four valve ports and guides and bearing cooling fins. Cooling is obtained by fitting a series of deflectors between the cylinder blocks. Four carburetters, two on each side, draw air through the crankcase and feed the mixture to passages cast in the camshaft casings which unite the cylinder-heads.

The Asso 500.R and the Asso 750 are perfectly normal Isotta-Fraschini engines of the water-cooled type. The smaller engine is fitted with a spur reduction gear. Both are engines with an excellent reputation in Italy and the bigger type has recently been putting up records in Czechoslovakia.

**MICHEL (Aviation Michel). Stand—Upper Gallery.**

Aviation Michel shows three engines, the 200/225 h.p. A.M.7 six-cylinder water-cooled in-line engine, the 100/120 h.p. A.M.14 and the 110/130 h.p. A.M.15 four-cylinder-in-line air-cooled engines.

The A.M. 7 is a very normal six-cylinder engine which has what look like Liberty-engine cylinders and valve-gear, and is of little interest.

The A.M.14 is a very compact four-cylinder-in-line air-cooled engine. The overhead valve gear is operated by inwardly-inclined push-rods and a camshaft which lies along the right side of the top half of the crankcase. A single carburetter on the side of the engine supplies the mixture to the inlet valves through a "T" type inlet manifold. The bottom half of the crankcase is arranged so that the engine may be run as a "wet" sump type or, if required, as a "dry" sump type with external oil tank.

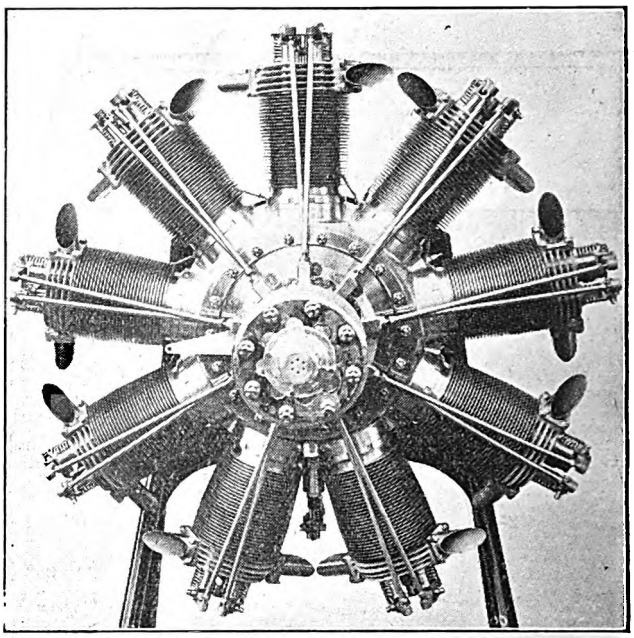
The A.M.15 is a refinement of the A.M.14. The cylinder dimensions and the weight of the two engines are the same, but the A.M. 15 differs from the A.M.14 in that the cylinders are held down to the crankcase by studs instead of long bolts from the cylinder-heads, the carburetter is mounted at the rear of the engine, the two magnetos are mounted on a cross-shaft which is placed practically vertically instead of horizontally, and this, together with the removal of the carburetter aft and the placing of the camshaft and its housing nearer the cylinders, makes a very narrow engine.

**PANHARD AND LEVASSOR. Stand 4.**

This old company continues to exhibit the 500 h.p. type 12.L twelve-cylinder valveless aero-engine which has been a constant feature of this company's stand for the last six or eight years. In addition there is shown the 100 h.p. Clerget heavy-oil radial engine together with five marine engines of Panhard design but of no aeronautical interest.

Panhard constructed the first experimental Clerget heavy-oil engine, which is claimed to be the first of its type to have flown in France.

It is a nine-cylinder radial which develops 100 h.p. at 1,800 r.p.m. and weighs 228 kgs. It has a steel crankcase and steel cylinders. The cylinder head has one air inlet and one exhaust valve and between these valves is located the fuel atomiser. Round the periphery of the crankcase and behind each cylinder is situated a fuel pump, the body of which is submerged in the fuel oil. Each pump is operated by a single cam mounted on the back end of the crankshaft through the medium of a circular cage carrying four risers which bear against the bases of the pump plungers. This circular cage runs at one-eighth the speed of, and in the opposite direction to, the crankshaft. The fuel is led from the pumps to the atomisers in the cylinder heads through thin copper pipes running up the back of the cylinders.



**The 100 h.p. Clerget heavy oil engine.**

The pumps are controlled by a moveable ring which surrounds the rear of the crankcase and is connected by short adjustable rods to each pump.

Two other examples of this engine are exhibited, one in the French Air Ministry exhibit and the other on the Morane-Saulnier stand. It was in a Morane aeroplane that the Clerget heavy-oil engine made its first flights.

The licence for the Clerget is now held by the Hispano-Suiza company, which firm shows a 250 h.p. model of very similar design to the model described above.

**PEUGEOT (Cie. Lilloise des Moteurs "Peugeot-Aviation"). Stand 7. Upper Gallery.**

This company shows the 250 h.p. Peugeot 12L.13 twelve-cylinder Vee water-cooled engine which has been homologated by the *Service Technique* while running on what is known as "Essence de securité" or white spirit, and a 600 h.p. Peugeot-Diesel which is a Junkers heavy-oil engine built under licence.

This latter engine is of the six-cylinder, opposed-piston type driving two crankshafts, one above and one below the open-ended cylinders. The two crankshafts are interconnected by a train of gears arranged down the casing at the front end of the engine. The airscrew is driven from one of the intermediate gear wheels in this train.

Fuel is injected into the cylinders by two pumps one on each side of each cylinder. Air is admitted through inlet ports which are uncovered by the pistons at the end of their outward stroke. The two opposed pistons then compress the air on their inward stroke and the heat generated fires the injected fuel. Combustion and expansion occur on the outward stroke until the exhaust ports are uncovered by the pistons when a charge of air supplied by a rotary blower forces out the burnt charge.

This type of engine has flown successfully in Junkers aircraft in Germany.

**POTEZ (Société Anonyme des Aéroplanes Henry). Stand 14.**

The Potez company has recently taken over the moribund Anzani company of historic repute and on their aeroplane stand they show, as an alternative power-plant for the Potez 36 light cabin monoplane, a 95-100 h.p. Potez six-cylinder radial engine which is to all intents and purposes a modernised Anzani.

So far as can be seen externally the modernisation consists solely of enclosing the push-rods and rocker gear. In all other respects the engine is characteristically Anzani, but whether an historic engine called by another name, particularly one associated primarily with aircraft, will smell as sweet to other French aircraft constructors remains to be seen. Nevertheless it should be a reliable power-plant for the Potez 36.

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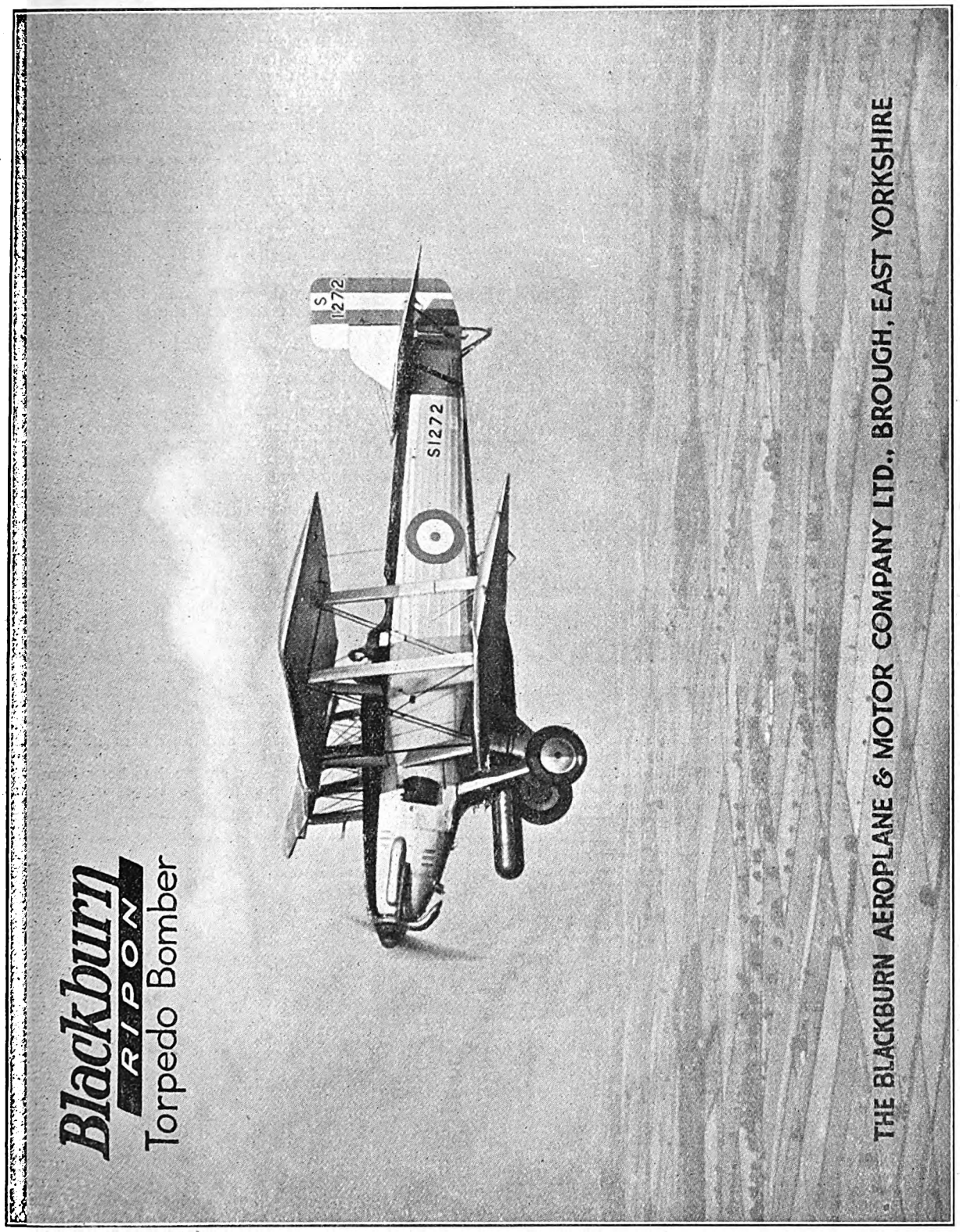




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**RENAULT (Usines Renault).** **Stand 31.**

The Renault company occupies a very large stand half of which is devoted to marine engines which have no possible aeronautical interest.

In the aero-engine section of the stand the company shows the 100 h.p. four-cylinder in-line air-cooled, the 100 h.p. seven-cylinder radial air-cooled, the 250 h.p. nine-cylinder radial air-cooled, two 500 h.p. twelve-cylinder Vee water-cooled, one direct drive and one geared, the 600 h.p. twelve-cylinder Vee water-cooled and the 750-850 h.p. eighteen-cylinder "W" water-cooled engines.

The two 500 h.p. and the 600 h.p. engines are of a comparatively old type each with four carburetters outside the Vee on long pendant inlet pipes and manifolds which should make installation difficult.

The 100 h.p. four-cylinder in-line engine is fairly well-known by its previous exhibition and by its use in quite a number of French light aircraft, specimens of which have been seen in this country from time to time.

The 100 h.p. radial engine is a new type which bears little resemblance to its bigger brother which made its first appearance at the last Paris Salon. It is a seven-cylinder radial with all the valve-gear and accessories at the back.

The big eighteen-cylinder "W" type engine is new. It has separate steel cylinders with welded steel water jackets which are tied together by the overhead valve gear casings. There are four valves per cylinder which are operated in a similar way to that used on the older Renault engines. There are two carburetters located at the back of the engine which feed into a turbo chamber whence the mixture is fed to the inlet valves by long pipes situated inside the Vees, two in one feeding the left and middle blocks and one in the other feeding the right block. The turbo is driven direct off the back end of the crankshaft. This engine like the other water-cooled models is fitted with the Renault centrifugal oil cleaner.

**ROLLS-ROYCE (Rolls-Royce, Ltd.)** **Stand 29.**

The engines which have caused more sensation than any in the Grand Palais have been the Rolls-Royce "F" and "H" models, one of each of which are shown together with a completely sectioned model of the "F" engine.

The existence of an engine of high power and small overall dimensions which has a built-in supercharger specially designed with the engine has aroused widespread interest among continental aircraft designers. With the remarkable success of the firm's "R" engine in the last Schneider Trophy contest coupled with the recent accomplishment of the Fairey Firefly fitted with a Rolls-Royce "F" engine in beating the best Continental fighter designs in Belgium this interest has been intensified.

Actually the "F" engine may be supplied in twelve different forms all incorporating the same main components. These twelve models are obtained by supplying the engine with three different gear ratios. These three different gear ratios may be applied to engines of two different compression ratios and they may be either of the normal non-supercharged type or they may be fitted with superchargers either of the moderate or full type.

These engines are known by the type letter "F," a series number XI, XII or XIV indicating which gear ratio is fitted and a letter "A," "B," "MS" or "S," "A" and "B" indicating the compression ratio and the "MS" and "S" the moderate or full supercharger.

The "H" engine is supplied with a moderate supercharger and with two different gear ratios. These are known as the H.XII.MS and the H.XIV.MS, respectively.

The "F" engine was designed with the object of producing an economical engine of low frontal area and light weight suitable for all military purposes, but particularly for high-performance single and two-seat types. The two banks of cylinders are cast in monobloc form which results in a much simpler and compacter form of assembly and provides an increased longitudinal rigidity for the whole engine. This engine can claim to have the smallest frontal area of any engine of the 500-550 h.p. class at present in production.

The "H" engine which is a bigger engine than the "F" has been designed for heavy duty work but is almost identical in construction to the smaller type.

**S.F.F.A. (Société Française de Fabrication Aéronautique).** **Stand 16 bis Upper Gallery.**

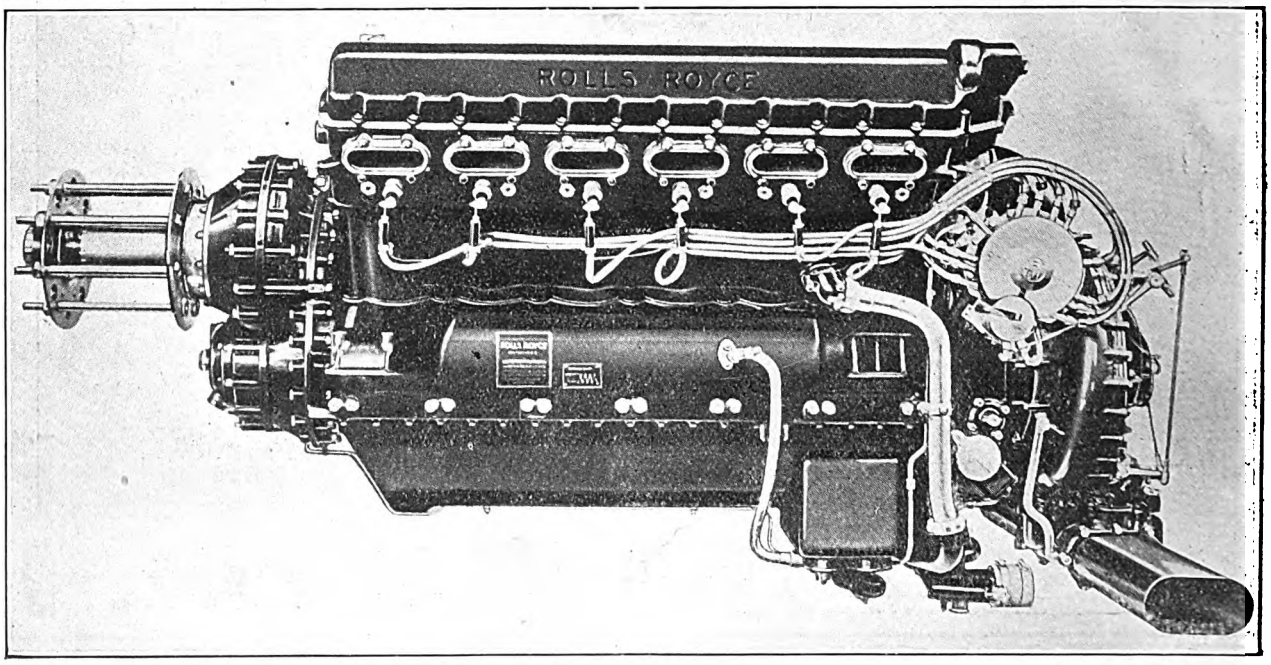
This firm shows two air-cooled radial engines, the 100 h.p. type A with seven cylinders and the 45 h.p. type B with three cylinders.

Both engines use the same cylinders, cylinder heads and valve gear. There is one inlet and one exhaust valve per cylinder and these are operated by push rods from a cam ring, a double one in the case of the seven-cylinder model, in the front half of the crankcase.

The front half of the crankcase of the three-cylinder model carries the two magnetos, fuel and oil pumps and self-starter where they are all very accessible. The carburetter is carried on the circular back plate which covers the main gas distributor chamber. Within this chamber is a fan attached direct to the rear end of the crankshaft which distributes the mixture by way of tangential inlet pipes to the cylinder heads. In the case of the seven-cylinder model only the magnetos are mounted on the front of the crankcase.

Each engine has attached to the exhaust outlets an individual silencer which ressembles in shape and size an opera-glass case. The exhaust gases pass into one end of the chamber and can only escape through circular slots cut in a tapering tube which passes through the other end of the chamber. The tapering tube has its larger end facing the direction of progress and air passing through it draws the exhaust gases out on the principle of an injector. It is claimed that this device gives rapid and complete evacuation of the exhaust gases and also acts as an effective silencer and flame damper.

The 45 h.p. three-cylinder engine has been homologated by the *Service Technique* but the bigger engine has not yet completed its trials.




**The Rolls-Royce "F" engine which has created very gr eat interest in the Paris Salon.**

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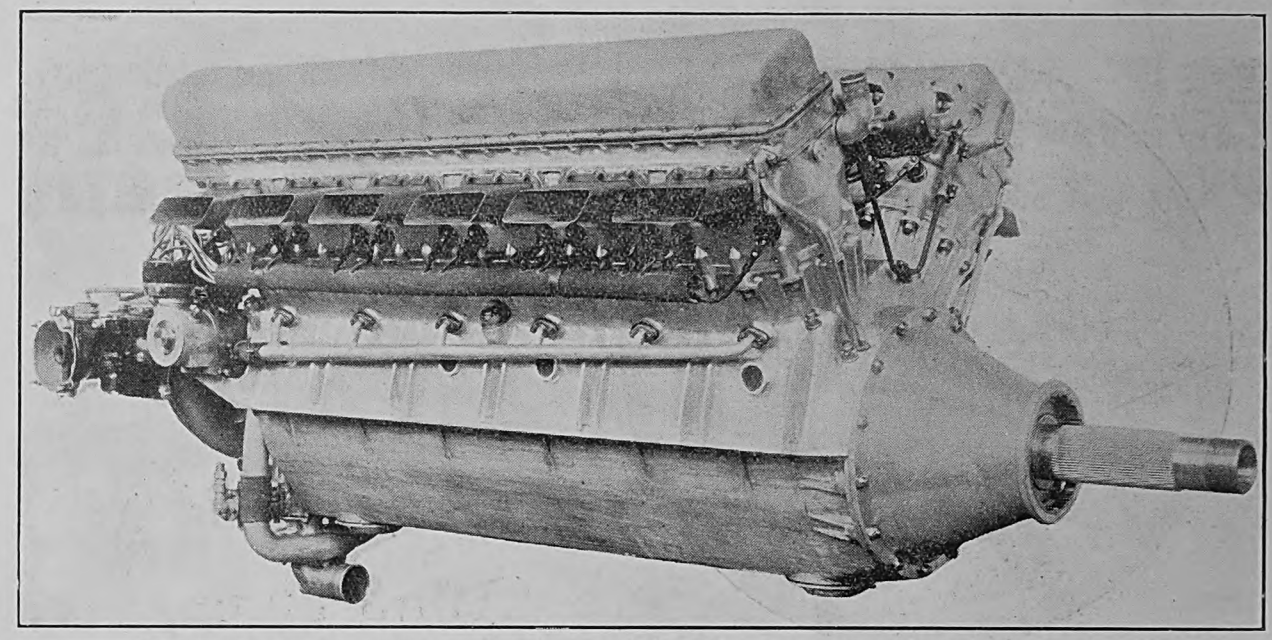


**The 1,000 h.p. Lorraine Eider engine, the newest, lightest and most powerful of the Lorraine range.**

blocks and held in place at their bottom ends by stuffing boxes, separate carburetters for each pair of cylinders bolted direct to the cylinder block and exhaust-heated, the use of four valves per cylinder, etc.

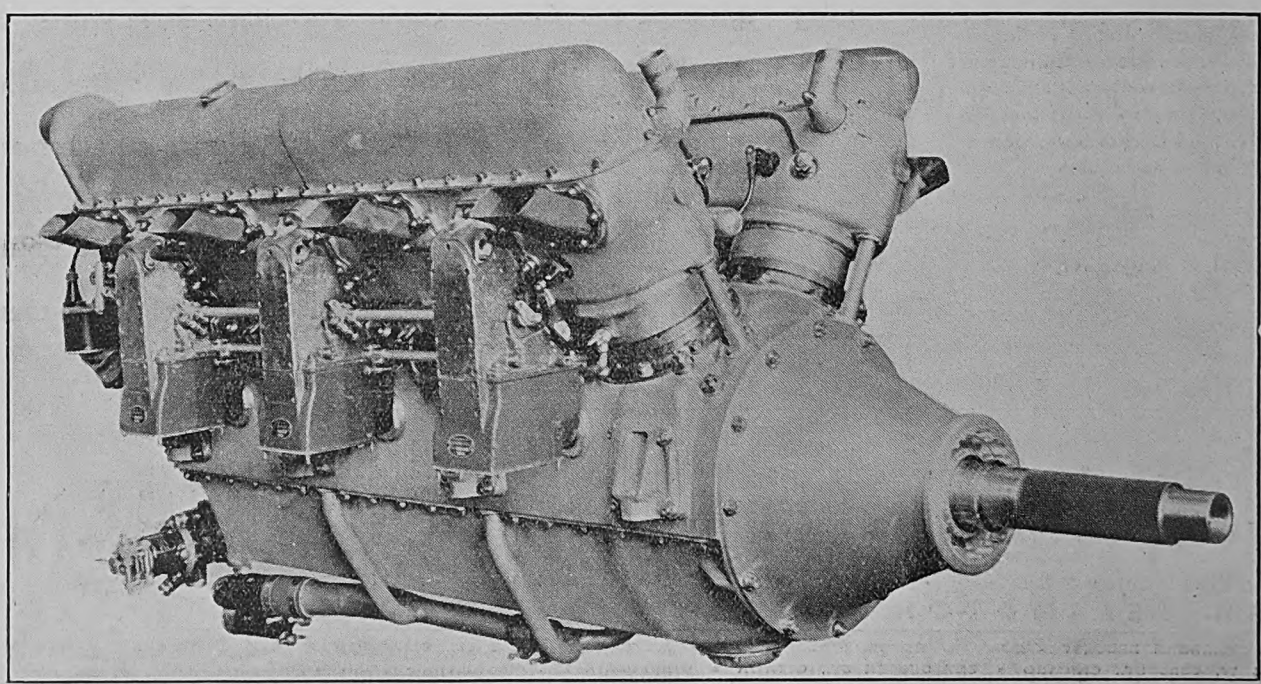
The Eider is of slightly different construction to the Courlis. The steel cylinders of 170 x 165 m.m. bore and stroke are screwed into the aluminium cylinder block and each block of six cylinders is bolted direct to the top half of the crankcase which has extensions cast in it to coincide with the bottom flanges of the cylinder blocks. The top half of the crankcase also accommodates the crankshaft bearings. There are two camshafts to each block of cylinders, and these are enclosed by a rectangular valve casing. Two carburetters are mounted at the back of the engine which feed into a fan chamber and thence through inlet pipes along the inside of the cylinder blocks within the Vee. With the Eider engine the Lorraine company has, by the judicious use of ultra-light alloys, the reduction of overall dimensions and the elimination of all extraneous detail, produced what must be the lightest engine for its power in France. Its actual weight, complete with airscrew boss, starter, fuel pump, r.p.m. drive, etc., is 595 kgs. in the ungeared form and 635 kgs. with reduction gear.

The Orion which is virtually an eighteen-cylinder version of the Courlis has successfully passed its official 50-hour test and is claimed to be the most powerful officially homologated engine in France.

The Pétrel which weighs but 530 grammes per h.p. has been designed as an engine suitable for fighter aircraft and it follows generally the construction of the Courlis but is of the twelve-cylinder Vee type. It can be supplied with or without reduction gearing.

Hitherto Lorraine water-cooled engines have been recognised as excellent and reliable power-plants for general purpose type aircraft and the 450/500 h.p. "W" type engine which is built under licence in eight different countries and is in use by twenty-three Governments can be bracketed with our own ever-blooming Napier Lion engine in popularity. With the new series of engines mentioned above the sphere of action of Lorraine engines is likely to expand. Lightness and compactness have been considered in addition to general reliability and to-day, with a range of engines ranging in power from 100 to 500 h.p. with their air-cooled, and from 450 to 1,050 h.p. with their water-cooled engines the Lorraine company is in a position to provide engines for any possible type of service.

The Lorraine air-cooled engines comprise a series of three with five, seven and nine cylinders known as the Mizar, Algol and Antarès incorporating the same cylinders, valve-gear and general accessories and developing 240, 300 and



**The 500 h.p. Lorraine Pétrel engine which has been produced as suitable for high-performance single- and two-seat military aircraft.**

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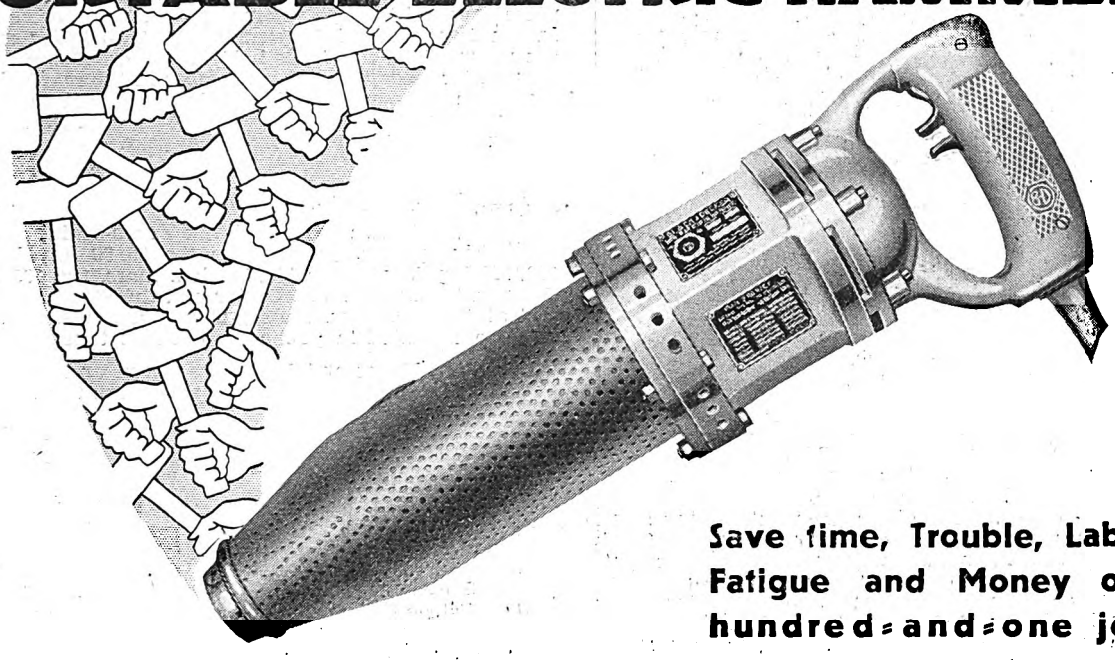

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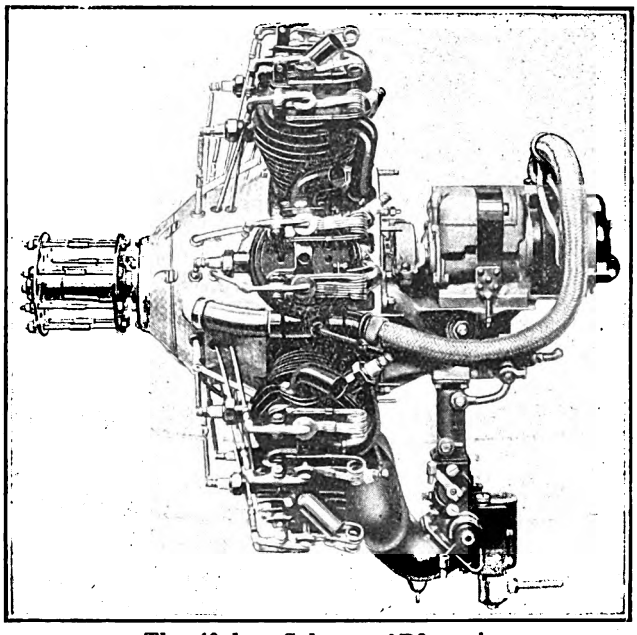


The 40 h.p. Salmson AD9 engine.

500 h.p. respectively. There are three smaller engines, the 100 and the 110 h.p. models which are identical, the second of which has a higher speed of revolution only, and the 120 h.p. model which has a 5 m.m. bigger bore and a slightly higher compression ratio than the previously mentioned engines but is otherwise identical to them. These three smaller engines carry their magnetos and fuel pumps on the front cover of the crankcase but are otherwise similar in general arrangement and design to the bigger engines.

The Lorraine heavy-oil engine is a nine-cylinder radial which develops 250 h.p. Its method of operation is very similar to that of the Clerget heavy-oil engine.

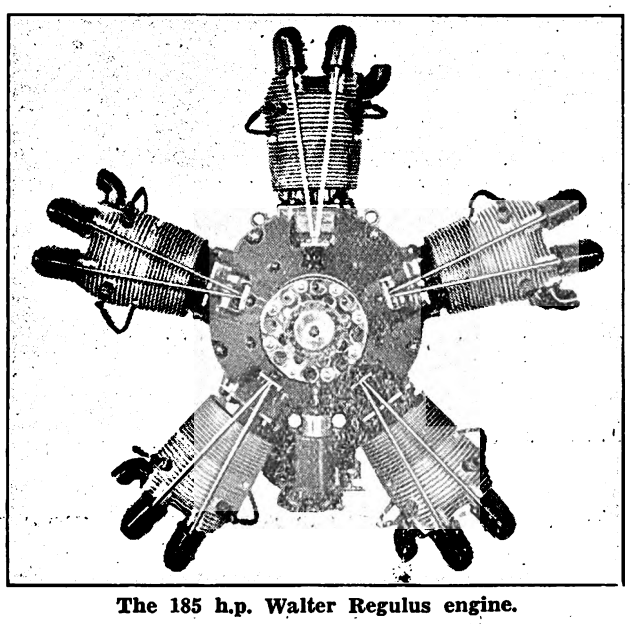
**SALMSON (Société des Moteurs). Stand 3.**

On this stand are shown the complete Salmson range of air-cooled radials which include the 40 h.p. 9AD, the 95 h.p. 7AC, the 120 h.p. 9AC, the 150 h.p. 9NCT, the 230 h.p. 9AB and the 500 h.p. 18AB. All these except the 150 h.p. 9NCT are well-known, particularly the little 40 h.p. engine which is the most popular and the most reliable small radial for light aircraft. The first three engines mentioned above are being built in England by British Salmson Engines Ltd.

The 150 h.p. 9NCT is a new engine which follows earlier Salmson practice very closely but the induction system has been augmented by a fan for the mixing and distribution of the gas.

**SIEMENS (Siemens and Halske A.G.). Stand 13.**

This well-known German company shows the 75/88 h.p. Sh.13a five-cylinder and the 500/600 h.p. Sh.20 nine-cylinder radial air-cooled engines.



The 185 h.p. Walter Regulus engine.

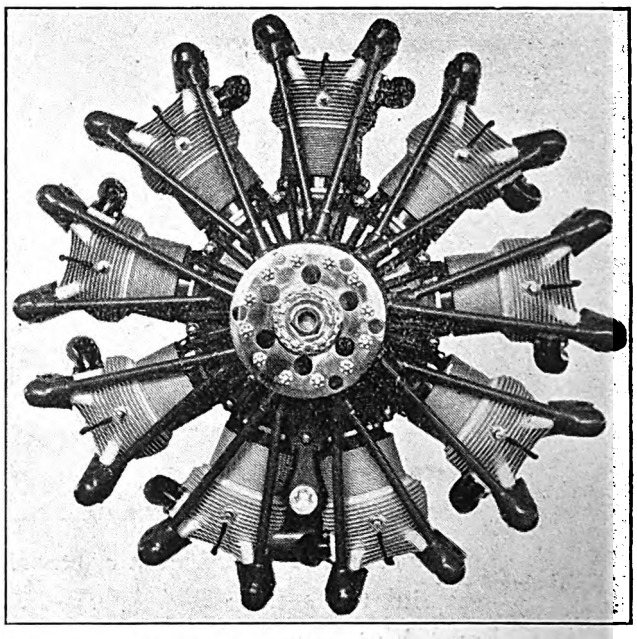
The Sh.13a is the latest version of this company's well-tried five-cylinder radial light aeroplane engine. It is a perfectly normal type radial and is generally well-known.

The Sh.20 was first exhibited at the Berlin Show in 1928. It is a big nine-cylinder radial which follows generally-accepted practice. It has steel cylinders with light alloy cylinder heads wherein there are one inlet and one exhaust valve operated through push rods from a cam drive situated in the front half of the crankcase. Two Bosch magnetos are mounted on the front half of the crankcase. A twin carburetter feeds into a fan chamber in the rear half of the crankcase whence the mixture is distributed to the inlet valves through tangential pipes. The exhibited engine is fitted with a 2:1 Farman reduction gear.

**WALTER (J. Walter and Co.). Stand 11.**

This well-known Czechoslovak aero-engine company shows six engines. These are the 85/90 h.p. Vega, the 110/120 h.p. Venus, the 145/160 h.p. Mars, the 185/220 h.p. Regulus, the 240/350 h.p. Castor and the 600/700 h.p. Atlas, and of these engines, the Regulus and the Atlas are new and are exhibited in public for the first time.

The Vega, Venus and Mars, five, seven and nine-cylinder engines form a series of engines which use the same cylin-



The 600 h.p. Walter Atlas engine.

ders, valve gear and other essential accessories and they are fairly well-known.

The Regulus is a new five-cylinder engine which in general size and arrangement is similar to the Castor but it has 10 m.m. less stroke and of course two fewer cylinders. It has been designed as a suitable power-plant for multi-engined commercial aircraft.

The Atlas is the latest and biggest product of the Walter company and completes the range. It is a very imposing nine-cylinder radial developing 700 h.p. at 1,950 r.p.m. for a weight, less airscrew boss and carburetter, of 480 kgs. In general arrangement it follows very closely the Walter practice embodied in the smaller and better-known types. It has steel cylinders, aluminium cylinder-heads, and one inlet and one exhaust valve per head operated by push rods from a double cam-ring in the front section of the crankcase. The push rods and overhead rocker gear are enclosed as in the now accepted and approved form.

A Zenith carburetter, with altitude control, feeds the mixture to a distribution chamber in the rear half of the crankcase wherein is a turbo-compressor, geared to the crankshaft at a ratio of 3.1:1, which distributes the mixture through tangential inlet pipes to the cylinder heads.

The Atlas is no doubt designed on the experience gained by the Walter company with the manufacture of the Jupiter engine under licence from the Bristol company through the Gnôme-Rhône company.

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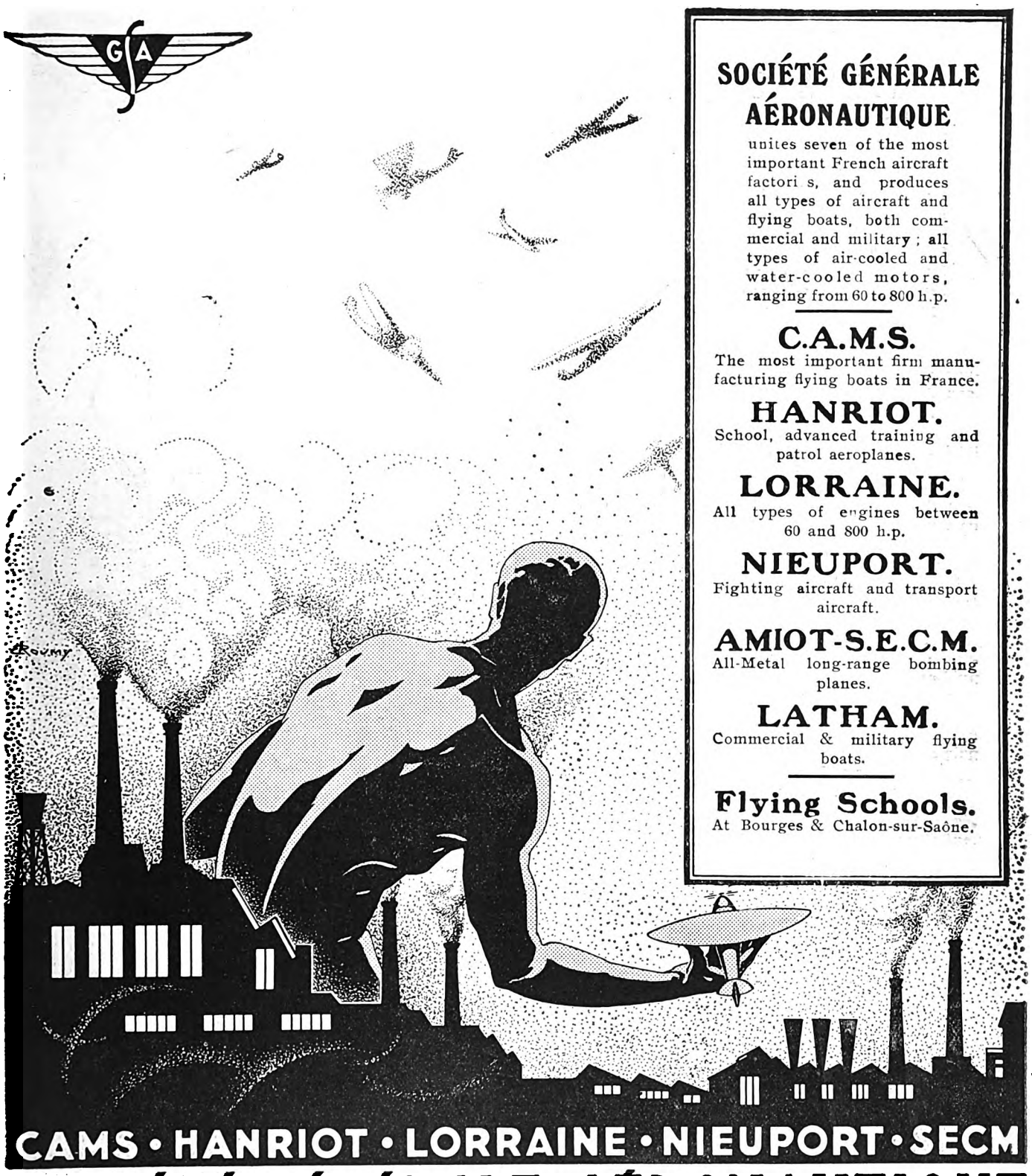


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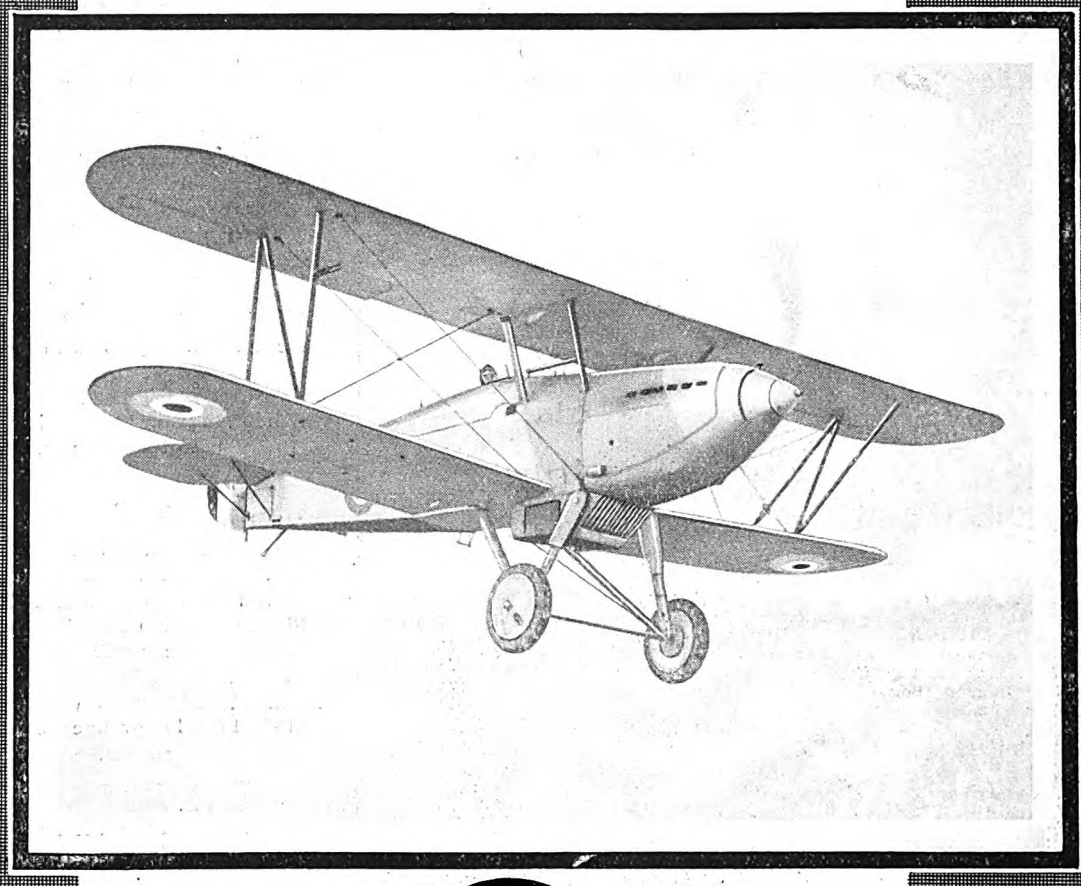

*Hawker "FURY."*
*"Flight" Photograph*

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, Dec. 2.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Group-Capt. E. D. M. Robertson, D.F.C., is appointed Director of Personal Services, Air Ministry (Nov. 10); Air Commodore P. F. M. Fellowes, D.S.O., relinquishes his appointment as Director of Personal Services, Air Ministry (Sept. 5).

Flg. Off. J. C. Larking (Auxiliary Air Force) is granted a s.s. comn. as a Plt. Off. on probation with effect from and with seniority of Nov. 17; Capt. S. H. Woolf (R.A.R.O.), is granted a s.s. comn. as a Flt. Lt. on the Supplementary List (Nov. 19); Lt. Anthony M. Kimmins, R.N., is re-attached to the R.A.F. as a Flt. Lt. with effect from Nov. 22, and with seny. of July 18, 1927; Plt. Off. on probation E. Coleman, D.F.M., is confirmed in rank (June 17).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—M. Watson (Oct. 13); G. F. Humphries (Nov. 1).

Flt. Lt. C. C. Edwards is placed on the half-pay list, scale B, Oct. 15 to Nov. 25, inclusive. (Substituted for the notification in the *Gazette* of Oct. 21). Flt. Lt. A. E. Thompson is placed on the retired list (Dec. 2).

The following Flg. Offs. are transferred to the Reserve (Nov. 28):—CLASS A.—C. A. Anderson, L. G. Gray, J. G. Parkin, L. C. Phillips, R. O. O. Taylor. CLASS C.—T. B. Byrne, F. J. Parker, R. J. Stone (Lt. Norfolk Regt., T.A.). Lt. K. Hunt, R.M., Flg. Off., R.A.F., relinquishes his temp. comn. on returning permanently to duty with the Royal Marines (Oct. 28); Lt. O. C. Jones, R.M., Flg. Off., R.A.F., relinquishes his temp. comn. on discharge from the Royal Marines (Nov. 8).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—H. B. G. Michelmore is granted a commission in Class A as a Plt. Off. on probation (Nov. 18); Flg. Off. F. W. Mundy is transferred from Class A to Class C. (Oct. 4); S. H. G. Trower relinquishes his commission on completion of service (April 1).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—The following to be Plt. Off.:—J. E. D. Benham (Oct. 27). Flg. Off. J. C. Larking relinquishes his commission on appointment to a s.s. comn. in the R.A.F. (Nov. 17).

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—Plt. Off. D. L. Lloyd is promoted to the rank of Flg. Off. (Oct. 21).

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—Flg. Off. E. S. V. Burton resigns his commission (Nov. 17).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE.

Sister Miss A. M. Hardwicke resigns her appointment (Dec. 1).

## Appointments.

GENERAL DUTIES BRANCH.—Squadron Leader J. Leacroft, M.C., to Station Administration, Halton, 1/2.

Flight Lieutenants C. R. Smythe, to No. 405 (Fleet Fighter) Flight, Mediterranean, 29/11. C. C. Edwards, to No. 32 Sqdn., Kenley, 26/11. H. H. V. Tristem, to Station Administration, Halton, 1/12. S. H. Woolf, to H.Q., R.A.F., Transjordan and Palestine, 28/11.

Flying Officers C. G. C. Woledge, to No. 10 Sqdn., Upper Heyford, 2/12. H. E. Sales, to No. 33 Sqdn., Bicester, 4/11. F. G. Fairhead, to M.A. E. E., Felixstowe, 24/11. A. McKee, to Aircraft Park, Lahore, 10/11. T. W. G. Eady, to No. 84 Sqdn., Shaibah, 26/10. de L. Cooke, to No. 27 Sqdn., Kohat, 7/11.

Pilot Officer E. F. J. L'Estrange, to No. 55 Sqdn., Hinaidi, 7/10.

MEDICAL BRANCH.—Flight Lieutenant R. F. MacLatchy, to Station H.Q., Boscombe Down, 4/11.

STORES BRANCH.—Flight Lieutenants H. F. Webb, to H.Q., Inland Area, 7/11. G. G. C. Piggott, to R.A.F. Base, Singapore, 22/11.

Flying Officer L. V. Hurst, to No. 207 Sqdn., Bircham Newton, 2/12. E. F. Smith, to A. and G. School, Eastchurch, 5/11.

ACCOUNTANT BRANCH.—Flying Officers R. S. Sweet, to No. 502 Sqdn., Aldergrove, 1/12. R. Cassels, to H.Q., 'Iraq Command, 5/11.

## Air Operations in 'Iraq.

The following information has been received from an official source:—

A certain amount of unrest occurred early in September in the Sulaimania area. During a political meeting in Sulaimania town a riot took place. The police were unable to control the rioters and 'Iraq Army troops were accordingly called out. In order to prevent a concentration of tribesmen in Sulaimania town demonstrations by aircraft were undertaken daily over the areas of Sulaimania, Halabja, Penjvin and Kirkuk, and warning letters to the chiefs were dropped by the aircraft. The action taken was effective in silencing the opposition, and the situation is now quiet.

As a result of the activities of Sheikh Mahmoud in spreading anti-Government propaganda in Southern Kurdistan a column composed of 'Iraq Army troops left Sulaimania on Oct. 29 for Serao in order to reassure the tribes in that district. A flight of No. 30 (B) Squadron was based at Sulaimania to co-operate with the column. On the morning of Nov. 3 a party of Kurdish followers of Sheikh Mahmoud attacked Penjvin, which was garrisoned by a small force of police, and succeeded in occupying a part of the village. Air action was accordingly taken against the rebels by aircraft of No. 30 (B) Squadron, and as a result the rebel picquets withdrew and their positions were occupied the following night by friendly Kurdish tribesmen, who drove the rebels out of Penjvin and relieved the police garrison. Penjvin is now in Government occupation once more. A second 'Iraq Army column has been formed and is co-operating with the first column against the rebels in the Choarta district. A composite squadron consisting of one flight of No. 55 (B) Squadron and two flights of No. 30 (B) Squadron, has also been formed and is working in co-operation with the ground troops. No further air action has been necessary, but air reconnaissances continue to be carried out over the disturbed districts.

## The R.A.F. in Transjordan.

Daily aircraft patrols are being made along the frontier between Transjordan and Nejd, where the tribes still persist in raids. The raiders are dealt with immediately they are observed, with the result that raids are becoming less frequent and less serious. Two raids were made during October by Nejd tribes against the Howeitat, in which 700 camels were looted, but otherwise the raids were not more serious than petty robberies.

The R.A.F. Units in Transjordan and Palestine consist of Headquarters, which is temporarily at Jerusalem, No. 14 (Bomber) Squadron, at Amman, a Headquarters and four sections of Armoured Cars and Meteorological Stations and a Supply Depot and a Hospital.

The R.A.F., commanded by Air Commodore P. H. L. Playfair, M.C., are directly under the High Commissioner for operations.

## Air Survey in Somaliland.

The Somaliland Detachment of No. 8 (Bomber) Squadron, supplemented by personnel of the Squadron at Aden, established a headquarters at Barran in Somaliland in November 1929 in order to make a survey of the frontier between British Somaliland and Italian Somaliland. This survey is being made in order to assist the Boundary Commission in delimitating the frontiers.

Unfortunately, the air photography was not completed by March 1930 when the bad weather set in and the work had to be postponed until November. Sixty miles of the frontier remain to be photographed. The work so far completed has proved of great assistance to the Boundary Commission.

## Seaplanes in the Sudan.

An extensive reconnaissance has recently been made along the Nile and over the swamps in the Southern Sudan by three Fairey IIIFs on floats of No. 47 (Bomber) Squadron, R.A.F.

The reconnaissance proved of considerable value in gaining experience of weather conditions during the rainy season and for collecting information about suitable seaplane bases and anchorages for use in the event of operations being undertaken in this area.

Pictures of these machines on floats appeared in THE AEROPLANE of Nov. 5, 1930.

## Rations From the Air.

According to *The Morning Post* of Dec. 4:—

Details have just become available in London of how the Royal Air Force all supplied food and provisions for two days to a column of 1,000 men on the march from Dargai to Chitral, on the North-West frontier of India, in September.

This was the first experiment of its kind, and its complete success is regarded as of the highest importance.

*The Morning Post* is, perhaps, unaware that the beleagured garrison at Kut was supplied with food and medical stores from the air in 1915 and that during the Air Operations in Kurdistan in 1923 Infantry columns were supplied with rations and stores on the march. Air Marshal Sir John Salmond's Despatch concerning these operations, which was published in June 1924, contains the following paragraphs:—

Over four tons of barley (a day's ration for the Column) were dropped by Vernons in one day. Although the country was in this case particularly unsuitable for such an operation, and little time had been available to make the best preparation, a considerable part of the total successfully reached the Column.

The wear and tear on boots and socks was prodigious, and during the operations 1,000 pairs of boots and 3,000 pairs of socks, together with a considerable quantity of similar stores, urgently required, were supplied by air.

I am confident that when this method of emergency supply has been more fully investigated and worked out it will prove a valuable asset for a Commander to have at his disposal in warfare of this type.

*The Morning Post* report continues:—

The infantry column set out over the difficult country north of

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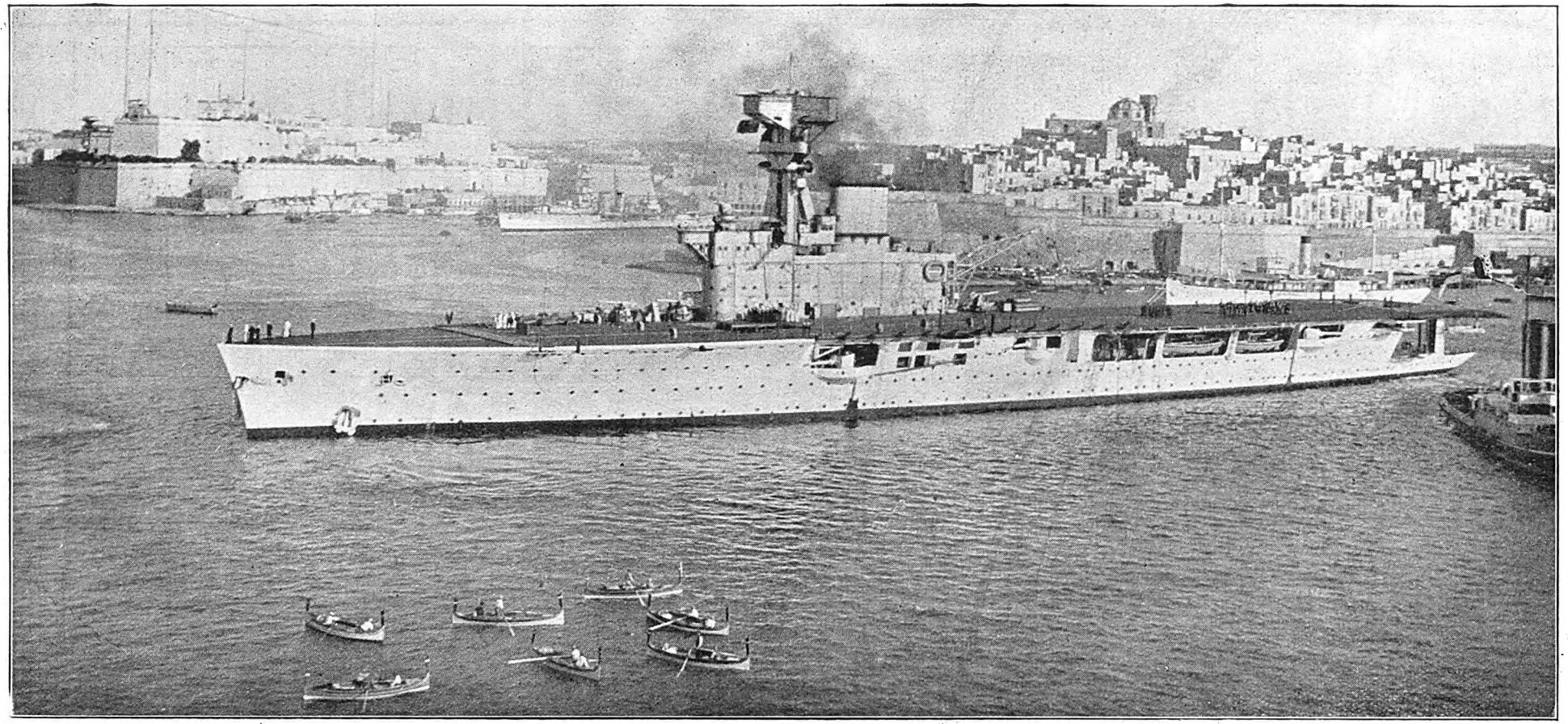

**EASTWARD HO!—H.M.S. Hermes leaving Malta Harbour on her way to the Far East. The R.A.F. Units in H.M.S. Hermes are No. 403 (Fleet Fighter) Flight, and No. 440 (Fleet Spotter Reconnaissance) Flight. The Senior Air Force Officer is Sq. Ldr. A. W. F. Glenny, M.C., D.F.C.**

Peshawar towards the Hindu Kush with two halts previously fixed, one between Dargai and Malakand, and the other farther in the mountains at Chakdarra. Each day the column required about three tons of provisions, and two Royal Air Force Squadrons were ordered to supply them.

The Squadrons, which belonged to No. 2 (Indian) Wing, stationed at Risalpur, are equipped with Westland Wapiti two-seater general purposes aeroplanes. The supplies were attached to small parachutes of a special type.

**Army Co-operation.**

The Army Collective Training Seasons culminated in September with four exercises in the Salisbury Plain Area by troops of the Aldershot and Southern Commands with Royal Air Force co-operation. The exercises involved the use of highly mobile forces, which were widely separated at the beginning of each exercise. Reconnaissance by R.A.F. Units formed an important feature. Much of this reconnaissance was Medium Reconnaissance and valuable experience was gained by the Army Co-operation Squadrons in this type of work.

During the first two exercises day bombers were employed against mechanised columns, and fighter aircraft were used to minimise the effect of such bombing.

Air co-operation, involving medium and close reconnaissance, artillery reconnaissance and photography was also provided during the exercises in Suffolk for which the Regular Forces of the Eastern Command were concentrated and during exercises at Catterick for the Regular Forces of the Northern Command.

**The Aircraft Carriers.**

H.M.S. *Hermes* arrived home from China on Sept. 24, paid off, and recommissioned at Chatham and sailed for China on Nov. 11, where she will resume normal routine flying duties in conjunction with other ships on the China station.

H.M.S. *Eagle* has been engaged on normal duties with the Mediterranean Fleet.

H.M.S. *Argus* is now in reserve.

H.M.S. *Furious* arrived at Devonport on Sept. 29 and is now undergoing a long refit.

H.M.S. *Courageous* maintained normal routine flying duties with the Atlantic Fleet on the Autumn cruise and took part in the Naval Exercises on the occasion of the visit of the Dominion Premiers to the Fleet at Portland.

H.M.S. *Glorious* completed extensive repairs at Malta on Nov. 15 and will now resume normal routine flying with the Mediterranean Fleet.

**Merchant Service Officers in the R.A.F.**

An Air Ministry Order announces that by arrangement with the Board of Trade, officers, apprentices and seamen in the Merchant Service holding short-service commissions in the R.A.F. may be allowed to count service in the R.A.F.

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towards the period of sea service required to qualify them for Board of Trade certificates.

The concession that may be granted under this arrangement is as follows:—

A candidate for a certificate of competency as master or mate may be allowed to count as qualifying service one half of any time he has spent in R.A.F. service, subject to a maximum allowance of six months for any grade or certificate.

The above concession will be subject to the officer's service in the R.A.F. being satisfactory in all respects.

**Foreign Officers with the R.A.F.**

Lieutenant Tsicaliotis of the Greek Air Force has now completed a three months' course at the School of Army Co-operation, Old Sarum, and will be attached to the Central Flying School, Wittering, until Dec. 23. He will then go to No. 3 Flying Training School, Grantham, for a few weeks.

Lieutenant Motzfeldt, of the Norwegian Air Corps, is attached to the Armament and Gunnery School, Eastchurch, to study the work and organisation of the Unit.

Lieutenant Seyfettin Bey and Lieutenant Esref Bey, of the Turkish Air Force, are attached to the R.A.F. Station, Tangmere, until Dec. 23 to study the organisation and work of fighter squadrons. These officers have recently completed a course at No. 3 Flying Training School, Grantham.

**The Eton War Memorial.**

A Memorial to the Seventy-Four Old Etonians who lost their lives while serving with the Royal Flying Corps, the Royal Naval Air Service and the Royal Air Force during the War 1914-18, was unveiled on Dec. 6 by Air Chief Marshal Sir John Salmond, Chief of the Air Staff. The Memorial is an alabaster tablet on which the names are inscribed under the three crests of the Flying Services.

Sir John Salmond said that men were not dead who fell in high courage and in a great cause, but lived for those who remained and for those who followed, as a great example and a grand inspiration.

At the end of the ceremony The Last Post was sounded by trumpeters of the Royal Air Force.

**Parachutes and Fatalities.**

A most unfortunate misprint occurred on Page 1312 of THE AEROPLANE last week. In a note on the number of Service parachute escapes during 1930, in which we suggested that but for the 20 escapes by parachutes there would have been 20 more deaths in flying accidents, the following sentence appeared,—"thus the increase of deaths would have been in proportion to the decrease in flying."

Probably most readers saw for themselves that the word "decrease" should have been "increase." The whole point is that if there had been no parachutes and there had been 20 more deaths the probability is that the additional number of deaths would have been in proportion to an increased amount of flying, and so the death rate would have remained about the same. That is to say the act of flying does not appear to be any safer than it has been for the last three or four years.

There would be considerable interest in knowing how many of these 20 parachute escapes happened after collisions in the air and also how many collisions there have been fatal and otherwise in the Air Force this year. Something will have to be done before long to improve visibility from aircraft and probably nothing *will* be done until the number of collisions through lack of visibility becomes so large that something definitely has to be done about it because of public outcry.—C. G. G.

**Promotion Examinations.**

The following officers have successfully passed promotion examinations C and B, which were held on Sept. 2, 3, 4 and 5. Those whose names are marked with an asterisk have obtained an aggregate of 80 per cent. or over of the total marks and will receive special notations in their records:—

*Promotion Examination "B"—Flying Officers.*—T. M. Abraham, G. Bartholomew, W. E. Barnes, W. L. Bateman, V. Q. Blackden, W. N. Blain, R. Brown, J. D. F. Bruce, F. W. Boggis, R. J. Carvell, C. E. Chilton, C. H. A. Colman, W. C. Cooper*, C. W. Dicken, P. C. Dickens, I. G. E. Dale, T. H. Downes, J. W. Duggan, P. de C. Festing Smith, L. G. Gray, J. D. Greaves, F. Gower-Jones, G. Francis, D. J. Harrison, J. A. P. Harrison, D. J. T. Haynes, D. V. Ivins, L. T. Keens, E. C. Lewis, A. F. Lingard, W. F. Lovering, P. L. P. Marrett, K. C. Netherton, J. Norwood*, H. L. Patch, N. A. Pearce, L. C. Phillips, H. Proud, H. M. Restell-Little, J. H. McC. Reynolds, D. N. Roberts, E. G. H. Russell-Stracey, D. W. R. Ryley, F. J. Taylor, R. O. O. Taylor, P. McK. Terry, G. A. V. Tyson, G. H. Walker, H. Waring, P. M. Watt, E. B. Webb, T. E. Worsley, H. G. Wheeler, J. R. Whitley.

*Promotion Examination "C"—Flight Lieutenants.*—A. H. Beach, O. E. Carter, N. L. Desoer, J. A. Elliott, A. W. Franklyn, H. K. Goode, A. Hesketh*, C. A. Horn, L. M. Iles, A. R. Jones*, R. Menzies, N. V. Moreton, P. Murgatroyd, V. Rees, R. J. Sanceau, R. D. Starley, E. S. Steddy, T. A. Warne-Browne, S. N. Webster.

**The Comrades of the Royal Air Forces.**

A very enthusiastic gathering formally resolved upon the formation of a Central Branch of this Association at a meeting at the Queen's Hotel, Leicester Square, on Dec. 5. Air Cmdre. B. C. H. Drew was in the Chair, and the following Committee was elected by the meeting:—*Chairman,* Flt. Lt. C. E. Cullen; *Vice-Chairman,* J. Goodhand; *Hon. Treasurer,* Flg. Off. Thomas; *Hon. Secretary,* Lieut. V. R. Walker, M.C., 31, Artisian Road, W.2.

Members of the Association who belong to no Branch in particular will be allotted to the Central Branch, including members abroad, where there are not enough to form a Branch on their own. Regular meetings of the Central Branch will be held at the Queen's Hotel.

**MIDDLE EAST CHAMPIONS.—The novices' boxing team of "C" Depot Squadron, R.A.F. Depot, Middle East, Abukir, who won the Middle East Command Novices Championship on Nov. 12, 13, and 14. Standing: L-AC. Bertie (second), L-AC. Rayment (heavyweight), L-AC. Campbell (lightweight), L-AC. Simpson (middleweight), L-AC. Warren (light-heavyweight), L-AC. Waugh (second). Sitting: L-AC. Humm (lightweight), L-AC. Simpson (welterweight), Flg. Off. Thomas (sports officer), L-AC. Westwood (featherweight), L-AC. Clarkson (trainer). On the ground: L-AC. Welsh (bantamweight), L-AC. Wheeler (flyweight).**

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### The Royal Air Force Club.

The R.A.F. Club will be closed from 14.30 hours on Monday, Dec. 29, until 12.30 hours on Tuesday, Dec. 30, for the purpose of holding the Annual Staff Dance, except in so far as affects bedroom accommodation (with breakfasts only) to residents and members who have engaged bedrooms before noon on Dec. 29. The Club will remain open during the Christmas holidays.

## R.A.F. SPORTS.

### Rugby Football.

The final trial for the R.A.F. representative Rugby Football team was held at Uxbridge on Dec. 5. The Depot ground was, as usual, wet and heavy, and the weather was cold with poor visibility. The trial did not disclose any new players of outstanding merit, but several of the players of previous years showed improved form. Notably among these was Flt. Lt. Hodder who played against the other Services in 1927 and 1928 and came back from Iraq in time to play against the Navy last season. He scored the only try in the trial.

L-AC. Williams and Plt. Off. Elsmie who played for the Probables were a better pair of halves than AC. Dixon and AC. James, their opponents, but the Selectors seem to have been very unwise in neglecting the obvious claim of Flg. Off. Maclean, who has been playing regularly for Richmond, for at least a trial at scrum-half.

Plt. Off. Coote, who was captain of the Cranwell team last year, was playing his first game since an operation to his knee and, although he has not yet recovered his full speed, his tackling was quite the best thing in the trial. He was transferred from the Possible to the Probable side at half time, but damaged his other knee and finished the game with a pronounced limp.

Sjt. Kerby, L-AC. Simmonds, and Flg. Off. Constantine stood out among the forwards, most of whom were good, but the team can hardly afford to be without Plt. Off. McKechnie, who played so well against both the other Services last year and was not included in the trial. Perhaps he, like Plt. Off. Bader, is on the injured list.

Once again one has to protest against the lateness in the season of this final trial. The Army representative team has already played at least one match.

The teams in the first half of the trial were:—*Probables*: *Full Back*, Flg. Off. Ievers. *Threequarters*, Flt. Lt Harvey, Flt. Lt. Hodder, Flg. Off. Llewellyn, Flg. Off. G. R. White. *Halves*, L-AC. Willilams, Plt. Off Elsmie. *Forwards*, L-AC. Simmonds, Sjt. Hall, Plt. Off. Gillan, Flg. Off. Constantine, Flg. Off. Beaumont, Sjt. Kerby, Flt. Lt. Beamish, Plt. Off. Williams. *Possibles*: *Full back*, Plt. Off. Sharpe. *Threequarters*, Flg. Off. N. E. White, Plt. Off. Coote, Sjt. Price, L-AC. Robinson. *Halves*, AC. Dixon, AC. James. *Forwards*, Plt. Off. Wallace, L-AC. Gibbs, Flg. Off. Patch, Flg. Off. Chignell, Plt. Off. Phillips, Flg. Off. Messiter, L-AC. Sugarman, Flg. Off. Hurren.—C. M. MCA.

### The Squash Rackets Championship.

The Royal Air Force Squash Rackets Championship was played at Queen's Club on Dec. 1, 2, 3, and 4 and was won for the third year in succession by Wing Cdr. F. L. Robinson, D.S.O., M.C., D.F.C.

The original entry for the Championship was over 230 players but a number of these were compelled to scratch. The results in detail were:—

FIRST ROUND.

Flg. Off. F. A. R. Bishop walked over, Flt. Lt. Lord Bandon scratched.

Flt. Lt. A. J. Holmes walked over, Sq. Ldr. H. L. M. Fraser scratched.

Flt. Lt. H. M. Mellor beat Wing Cdr. A. H. Peck (9—4, 9—1, 9—3).

Flt. Off. J. Norwood beat Flg. Off. W. H. Hutton (7—9, 9—2, 9—5, 9—4).

Flt. Lt. F. E. Nuttall walked over, Sq. Ldr. F. G. M. Williams scratched.

Wing Cdr. F. L. Robinson (holder) beat Flt. Lt. S. L. G. Pope (9—0, 9—4, 9—1).

Wing Cdr. A. G. W. Belfield beat Flt. Lt. E. H. Richardson (9—4, 9—2, 9—0).

Flg. Off. C. H. Turner walked over, Plt. Off. N. Stratton scratched.

Plt. Off. J. W. C. More beat Sq. Ldr. J. P. Coleman (10—8, 9—1, 9—3).

Sq. Ldr. C. E. H. Medhurst beat Flt. Lt. A. H. W. Cocks (9—7, 9—5, 6—9, 9—7).

Plt. Off. G. R. A. Elsmie beat Flg. Off. E. C. Hudleston (9—1, 9—4, 3—9, 10—8).

Sq. Ldr. J. H. D'Albiac beat Flg. Off. T. Coverdale (7—9, 9—0, 9—1, 9—3).

Flt. Lt. D. A. Boyle walked over, Flg. Off. G. H. Musson scratched.

SECOND ROUND.

Flg. Off. F. A. R. Bishop beat Flt. Lt. A. J. Holmes (9—5, 9—10, 9—1, 3—9, 9—6).

Flt. Lt. H. M. Mellor beat Flg. Off. J. Norwood (10—8, 9—2, 9—0).

Air Commodore W. F. McN. Foster beat Flt. Lt. F. E. Nuttall (9—1, 9—1, 9—7).

Wing Cdr. F. L. Robinson (holder) beat Wing Cdr. A. G. W. Belfield (7—9, 9—6, 8—10, 9—2, 9—1).

Flg. Off. C. H. Turner beat Air Commodore F. V. Holt (9—6, 9—3, 2—9, 9—7).

Plt. Off. J. W. C. More beat Sq. Ldr. C. E. H. Medhurst (9—2, 9—4, 9—1).

Plt. Off. G. R. A. Elsmie beat Sq. Ldr. J. H. D'Albiac (9—5, 9—1, 9—2).

Air Commodore A. D. Warrington-Morris beat Flt. Lt. D. A. Boyle (9—1, 9—5, 7—9, 5—9, 9—7).

THIRD ROUND.

Mellor beat Bishop (9—0, 10—8, 9—2).

Robinson beat Foster (9—6, 9—4, 9—4).

More beat Turner (9—5, 9—2, 10—9).

Elsmie beat Warrington-Morris (9—1, 9—0, 9—5).

SEMI-FINAL ROUND.

Wing Cdr. Robinson beat Flt. Lt. Mellor (9—6, 9—6, 9—0).

Plt. Off. Elsmie beat Plt. Off. More (6—9, 9—4, 9—1, 10—8).

FINAL ROUND.

Wing Cdr. Robinson beat Plt. Off. Elsmie (9—2, 8—10, 4—9, 9—3, 10—8).

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## A CANADIAN ORDER.

The De Havilland Aircraft Co. Ltd., through its Canadian associated firm, De Havilland Aircraft of Canada Ltd., have just received an order for ten Puss-Moths, to be supplied to the Royal Canadian Air Force for blind flying training.

Blind flying has not so far been a regular feature of Canadian Air Force training, although considerable night, fog and cloud flying is done in the natural course of practice. Enclosing the student in his compartment so that he has no outside visibility whatever is increasing in favour for this kind of training. The Canadian authorities recently held a competition among several machines, both British and American, to select a suitable type, and as the result ten Puss-Moths, with seats suitable for parachutes, have been ordered.

## THE POST OFFICE AND AIR MAILS.

The Postmaster-General has consented to receive a Deputation from the London Chamber of Commerce at the General Post Office on Tuesday afternoon, Dec. 16. Various questions affecting the air mail will be raised.

The Deputation will be led by the Lord Herbert Scott, President of the Chamber, and the other members will be:—Sir Geoffrey Clarke, Deputy Chairman of the Council of the Chamber; Col. the Master of Sempill, Chairman of the Civil Aviation Section; Sir Robert McLean, Deputy Chairman of the Civil Aviation Section, and Mr. A. de V. Leigh, Secretary of the Chamber.

## THE FLYING ARCHBISHOP.

Dr. Nathan Soederblom, Primate of Sweden and Archbishop of Upsala, who has been awarded the Nobel Peace Prize for 1930, is a keen traveller by aeroplane. When I talked to him at Farnham Castle a year or two ago, where he was attending the Continuation Committee of the Stockholm Life and Work Conference of 1925, of which he was the prime mover, he told me that he liked whenever possible to fly to these international church gatherings, at which he is such a familiar figure. "I don't do this because I am in a hurry," he explained, "but because by thus avoiding much of the fatigue of travel I can preserve that phlegm, as you call it, and balance of mind that enables you to think out problems and get things done."

The Archbishop, who speaks as fluently in English, French, German and Dutch as he does in Swedish, has preached in Canterbury and Winchester Cathedrals in this country, and he delivered the opening sermon at the 7th Assembly of the League of Nations. His critics sometimes call him "the Protestant Pope," but if this is unkind, his friends nevertheless feel that he is one of the chief rallying points for the united work, especially in the social sphere of the Protestant Church of Europe. He is a very keen internationalist and ardent worker for peace. Besides being a man of affairs and a theologian he is also in his leisure moments a first-class musician.—H. W. P.

## HEAVY OIL ENGINES.

As mentioned in this paper last week the Akroyd Stuart Memorial Prize Lecture on The Origin and Development of Heavy Oil Engines will be delivered by Mr. D. R. Pye, M.A., F.R.Ae.S., Deputy Director of Scientific Research at the Air Ministry, on Thursday next, Dec. 11, in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m.

Mr. Pye's paper will cover the following ground: 1 Historical. 2. Heavy oil versus petrol. 3. Cycles and modes of operation employed. 4. Single cylinder research work. 5. Practical Developments. 6. Future progress.

This is the first award of the Akroyd Stuart Prize, and the paper is one which will attract considerable attention, coming as it does from one of the leading engine authorities in the country.

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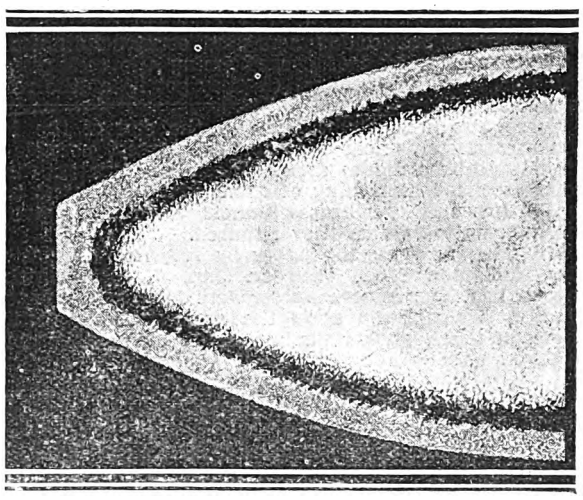

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## THE USE OF SMALL WIND TUNNELS.

On Dec. 4 Mr. H. Glauert, M.A., F.R.Ae.S., read a paper on The Use of Small Wind Tunnels before The Royal Aeronautical Society. Mr. Glauert says in his paper that his object is to bring forward a plea in defence of these poor relations, that is, 4-ft. tunnels, of the modern plutocratic tunnels. But after the discussion Mr. Glauert suggested that the reason, or one of them, for writing his paper was to make designers and constructors use their 4-ft. tunnels, instead of overwhelming the compressed air and very large wind tunnel (if they got it) of the research establishments.

There was little doubt that by the end of the lecture and discussion a clear case for the largest possible wind tunnel had been made; designers and constructors who had hoped to hear something of small and economical tunnels found that only the biggest tunnels would really give them the information which they required.

Mr. Glauert opens his paper by referring to that which Mr. McKinnon Wood read on Jan. 9, 1930, which was reported in THE AEROPLANE for Jan. 29. In this paper Mr. Wood laid emphasis upon the importance of testing at values of the Reynolds number, which are actually obtained in flight.

[Reynolds number $= \frac{\text{density} \times \text{linear scale} \times \text{speed}}{\text{viscosity}} = \frac{\rho LV}{\mu}$ —ED.]

Thus, if the Reynolds number is to be the same as that which obtains in flight, and for tests a small model has to be used, the speed of the air-stream in the tunnel must be increased up to speeds which are not economically obtainable. The other way out of the difficulty is to increase the density.

The modern developments which make high numbers of Reynolds number obtainable are the tunnel wherein the stream of air is compressed to 20 atmospheres, and the large wind tunnel with a free jet 20 to 25 ft. in diameter. The ambition to achieve the full-scale Reynolds number in our experiments, to make tests on actual aeroplanes under laboratory conditions, and to realise high speeds in other tests, may lead to some disparagement of the older wind tunnels, and more particularly the humble 4-ft. tunnel.

Mr. Glauert wishes to bring forward a plea in defence of these small tunnels and finds some support from the fact that Mr. Wood mentioned the usefulness of these small tunnels, and that this view was supported by some members who took part in the discussion. He also points out that small tunnels, and particularly the 4-ft., are valuable for calibrating instruments, such as pressure-heads and airlogs. When high speeds, approaching the speed of sound, are required even smaller tunnels have to be used.

There are two important limitations to the use of the small tunnel as an aid to design. The first is the scale of the test, because the small dimensions of the model imply the impossibility of achieving anything but a small fraction of the full-scale Reynolds number. The second is the detail of the model, because its small dimensions make difficult or impossible the correct reproduction of the minor details of the form of the aeroplane.

Mr. Glauert says that he will try to establish the proposition that partly by our improved theoretical knowledge and practical experience and partly by improved tunnel design we can obtain from a 4-ft. tunnel experimental results more reliable and valuable than those which we obtained ten years ago from our standard 7-ft. tunnels. [But presumably the technique of using 7-ft. tunnels has also improved during the same period.—ED.]

He says that our improved knowledge of the nature and magnitude of the constraint which is imposed upon the flow by the walls of a wind tunnel has increased the usefulness of the small tunnel. He then gives some theoretical considerations and practical results which show the excellent agreement between the corrected values of tests made in 4-ft. and 7-ft. tunnels. As this correction is inversely proportional to the area of the cross-section of the tunnel, the correction for a given wing system tested in a 4-ft. tunnel is roughly three times the correction for the same test in a 7-ft. tunnel.

Actually the uncertainty of the correction formula is quite small when the span of the model does not exceed three-quarters of the width of the tunnel, and by virtue of our knowledge of this correction we are justified in testing in a 4-ft. tunnel wing systems whose span is as high as 3 ft., or whose total area is as high as 4 sq. ft. The results so obtained will be more reliable than uncorrected results obtained from a 7-ft. tunnel.

Mr. Glauert says that the theory of this correction for interference has been examined in greater detail by Terazawa and Rosenhead, whose more accurate formula should be used when the span of the wing exceeds three-quarters of the width of the tunnel or if the area of the wing is unduly large.

He says that for tests with airscrews and bodies a wind-tunnel with open jet is better used. In this connection he mentions that the tunnel interference on a body, often referred to as the choke correction, was greatly overestimated. He quotes figures in support of this statement, and says that even when the diameter of the body is as high as one-fifth that of the tunnel, the effective velocity is increased by less than one per cent., and as this increased velocity only reacts on some part of the body, the tunnel interference on the drag of the body must be extremely small.

Some experiments have recently been made at the R.A.E. to investigate the interference due to the walls of the tunnel on the maximum lift coefficient of the wing. These showed that the increase in maximum lift coefficient due to the constraint of the tunnel walls was independent both of the shape of the aerofoil and the height of the tunnel. The correction appears to be proportional to the square of the width of the tunnel.

Defining the power ratio of a wind tunnel as the ratio of the power used to the kinetic energy of the air passing through the working section every second, Mr. Glauert says that the power ratio of the N.P.L. type of wind tunnel is approximately 2.0, but this value can be reduced very considerably by an improved design of tunnel. The power ratio of the new 5-ft. open-jet tunnel at the Royal Aircraft Establishment is roughly 0.4, and he understands that a value as low as .2 has been obtained in a new American tunnel.

If we accept 0.4 as a reasonable value for a modern wind tunnel the power consumption can be reduced to one-fifth of its previous value, or the wind speed may be increased by 70 per cent. The wind speed in our typical 4-ft. tunnel will then rise from 80 to 135 ft./sec. This will increase the Reynolds number of the test from 250,000 to 425,000.

Mr. Glauert has prepared an interesting chart by plotting Reynolds numbers logarithmically. He has made a ladder of which every rung is equal to a doubling of the Reynolds number. At the bottom is the uncorrected 4-ft. tunnel, and at the top is the racing seaplane. The modern 4-ft. and 7-ft. tunnels have filled in the gaps between the corrected 4-ft. tunnel (old style) and the small aeroplane (landing) where there were two rungs.

Mr. Glauert admits that for the value of the maximum lift coefficient we must rely on determinations made in flight, or on experiments made in a wind tunnel which can realise the actual Reynolds number corresponding to full-scale conditions.

After discussing various aspects of the problem, he says with regard to the minimum drag of wing sections that for complete accuracy we must again rely on tests in a compressed-air tunnel, or in a large tunnel, but the position is more hopeful than for the maximum lift coefficient. In this case the scale effect is smaller, anomalous behaviour is less frequent, and the tests can be arranged to achieve a higher Reynolds number.

Mr. Glauert then outlines special devices which can be used to increase very considerably the scale of the tests. Thus one may test an aerofoil stretching almost across the tunnel with end pieces attached to the wall. To test special conditions the model may be made larger and the end portions of the wings omitted from the tunnel. If the tunnel is of the open jet type the extremities of the model may be left projecting beyond the boundary of the jet. There is the difficulty, however, of adequate reproduction of minor details of the structure.

He concludes by saying that in spite of these and other limitations, he considers that a 4-ft. wind tunnel, particularly if it be one of modern design, should still prove to be a very valuable aid in the design of an aeroplane. The 4-ft. tunnel should be used for preliminary tests in the early stages of design to determine the best relative position of wings and body, to determine the balance of the aeroplane and the power of the controls, and to investigate the possibilities of improvement in minor details.

When the main outlines in design are fixed, experiments with a larger-scale model suitable for a larger tunnel may be desirable to clear up any points of uncertainty. The compressed-air tunnel will be required to determine the maximum lift of the aeroplane and a large wind tunnel may be desirable to investigate the operation of wing slots and radiators or to investigate such problems as the shielding of the cockpit.

### THE DISCUSSION.

MR. FAIREY had introduced the lecturer by saying that he supposed that there was no designer who had not at some time regretted having accepted the evidence of the wind tunnel and also conversely there was no designer who had not regretted not taking its evidence, and by saying that the older hands in aviation had always regarded it as a somewhat undependable ally. Opening the discussion, he said that designers who had 4 ft. wind tunnels would leave the lecture with an increased faith in the results and those who had hitherto distrusted it might be tempted to reconsider their decision. He asked for the minimum size and cost of a tunnel which would give the designer results upon which he could rely.

MR. REX PIERSON said that his firm (Vickers) had been using a 4-ft. tunnel for a number of years with a fair amount of success.

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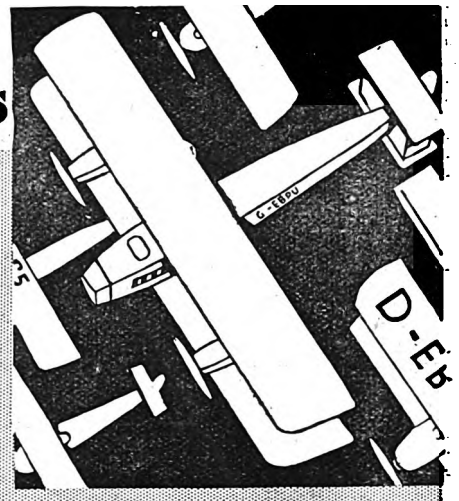


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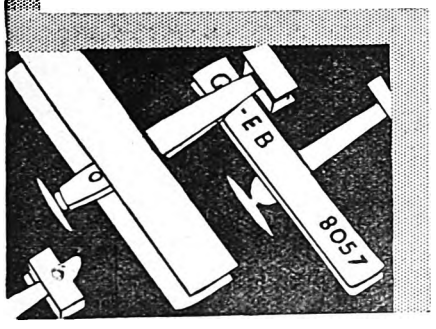


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It was difficult to produce a model with enough accuracy, and although results which were 90 per cent. accurate could be got, one could almost guess up to this amount,—the last 10 per cent. was so important.

MR. NORTH said he was loth to take the reliability of some of the conclusions in the lecture as confidently as Mr. Glauert. He thought that designers required more accuracy than research workers. The former's results had to compare with full scale, whereas the latter served as a basis for subsequent discussion. As one could calculate everything except maximum lift and drag, what was the good of a 4-ft. tunnel? He asked how the very low power ratio had been obtained in the United States.

MAJOR GREEN said that they had resisted putting in a wind tunnel for years but installed one a short time ago. Their results had been encouraging. If they knew how to reduce the power consumption they might be tempted to scrap what they had and rebuild.

DR. PEARSON then tackled the lecturer about some of his more abstruse calculations and illustrated his case with diagrams on the board.

DR. DOUGLAS said that on a recent trip to the Continent he had been impressed with the higher speeds in vogue over there. These higher speeds allowed the use of correspondingly less fine instruments. He suggested that putting the money into the motors to get higher speeds and using simpler balances might be worth while.

MR. BRYANT said he had a personal liking for the 4-ft. tunnel. He thought the effect of turbulence on drag and the effect of stability on control would not always be beyond the capabilities of the 4 ft. To illustrate that an obstruction near the walls might increase the choke effect, he quoted a case where a bundle of electric wires had increased the velocity by 5½ per cent.

MR. MCKINNON WOOD said he was inclined to suggest that designers and constructors would find that tunnels of the type which had recently been put up at Farnborough were valuable. They had an open jet 5 ft. in diameter. They were of the Göttingen type and had the advantage that they took up a very small space. He was not quite sure whether the open jet had all the advantages, as a closed tunnel gave the same speed with half the power. The boundary of the open jet was not well defined.

MR. COWLEY suggested that Mr. Glauert had championed the cause of the 4-ft. tunnel as half a loaf was better than no bread. But no designer would accept half a loaf. Work with airscrews in a 4-ft. tunnel would be difficult because of the difficulty of accurately reproducing a screw in such small sizes. In metal structures the effect of rivet-heads was important, but these could not be reproduced in a 4-ft. tunnel. He referred to Prof. B. M. Jones' remarks about the effects of artificially-produced turbulence.

AIR COMMODORE CHAMIER said he for one was completely undeceived. He made an amusing speech in which he expressed his opinion of the 4-ft. tunnel and said that the best tunnel was the biggest. He also said, referring to the lecturer's proposal of making tests of separate components, that chopping an aeroplane to bits was no good because 2+2+2+2+2 did not make 10 in aerodynamics.

ANOTHER SPEAKER pointed out that the advantage of an open jet was that you could have two balances, one for working on and the other for having the next model rigged.

MR. OWER said that he thought Mr. Glauert had made a good case if one were content with sections and simple parts. He then quoted an interesting case of the interference effects of a nacelle on a wing. Such interference effects may extend along the wing to 6 or 7 times the diameter of the nacelle.

MR. GLAUERT in his reply said his illustration of the effect of choke was intended to show how incorrect the old assumptions were. After dealing with various abstruse points raised by members Mr. Glauert concluded by suggesting that the real reason for backing the 4-ft. tunnel was to make manufacturers who have such tunnels use them and not overcrowd the compressed air and large wind tunnels.

## THE FAR EAST RECORD.

The amazingly rapid journey of Mijnheeren van Dyk and Wiersma to Sumatra and back on the first scheduled trip of the Netherlands Indies Air Mail excited so much interest that we wrote to Holland for definite figures. They will prove hard to beat. Mr. E. Smits of the Fokker firm kindly supplied them. And here they are:—

OUTWARD.

1st day, Amsterdam-Budapest, 1,165 kms., 6 h. 32 m.
2nd day, Budapest-Stamboul, 1,090 kms., 6 h. 27 m.
3rd day, Stamboul-Aleppo, 937 kms., 6 h. 2 m.
4th day, Aleppo-Bushire, 1,520 kms., 9 h. 30 m.
5th day, Bushire-Karachi, 1,758 kms., 10 h. 38 m.
6th day, Karachi-Allahabad, 1,487 kms., 9 h. 2 m.
7th day, Allahabad-Akyab, 1,328 kms., 7 h. 43 m.
8th day, Akyab-Bangkok, 1,073 kms., 6 h. 40 m.
9th day, Bangkok-Medan, 1,332 kms., 7 h. 20 m.
10th day, Medan-Bandoeng, 1,561 kms., 9 h. 3 m.
Total: 13,251 kms., 78 h. 57 m.

HOMEWARD.

1st day, Bandoeng-Medan, 1,667 kms., 9 h. 44 m.
2nd day, Medan-Bangkok, 1,332 kms., 7 h. 37 m.
3rd day, Bangkok-Allahabad, 2,401 kms., 14 h. 12 m.
4th day, Allahabad-Jask, 2,440 kms., 15 h. 31 m.
5th day, Jask-Baghdad, 1,590 kms., 9 h. 20 m.
6th day, Baghdad-Cairo, 1,298 kms., 9 h. 3 m.
7th day, Cairo-Athens, 1,092 kms., 8 h. 13 m.
8th day, Athens-Vienna, 1,329 kms., 7 h. 51 m.
9th day, Vienna-Amsterdam, 996 kms., 6 h. 20 m.
Total: 14,145 kms., 87 h. 51 m.

The additional distance is explained by the fact that they returned by way of Cairo and Athens, instead of by the more direct route from Baghdad to Aleppo and Stamboul (Constantinople) and the Danube.

The average petrol consumption per hour was 163 litres for the three engines, the oil consumption was 3.5 litres per hour for three engines. The engines were Bristol Titans.

The weights at the start homeward bound were as follows:—

| | | |
|---|---|---|
| Empty with complete equipment | | 3,130 kgs. |
| Full tanks (1,400 litres petrol, 105 litres oil .. .. .. .. | 1,145 kgs. | |
| Crew and luggage .. .. .. | 304 kgs. | |
| Mail .. .. .. .. .. | 221 kgs. | |
| Goods .. .. .. .. .. | 31 kgs. | 1,701 kgs. |
| Total weight .. .. .. | | 4,831 kgs. |

Altogether it was a splendid show of which the Fokker firm and the Bristol people may well be proud.

## AN AMERICAN VIEW.

The popular American magazine *Liberty* which sprang into popularity through publishing *War Birds* continues to take a vivid interest in aviation thanks to the fact that its proprietors Colonel McCormick and Captain Patterson are themselves active aviators. On Nov. 22 it published an article by Mr. Bogart Rogers who served in the R.F.C. in 1917-18 with 32 Squadron, though he is an American by birth. After saying a lot of rude things about American aviation and how it went air-mad as the result of Charles Lindbergh's trans-Atlantic flight, which he says frankly proved nothing, he goes on:—

Eleven years ago the Air Mail averaged a speed of about ninety miles an hour. To-day it averages approximately one hundred miles an hour. You may call that progress—I call it a crying shame.

Noise has been a terrible nuisance. Cabin planes rumble and roar fit to break the eardrums of the passengers inside. Have the engineers figured out a way to eliminate racket? Not that I've noticed.

Most two-seater planes are built in tandem—like a "Gay Nineties" bicycle. A perfectly silly arrangement. Not fifty people in all America would buy an automobile with such a seating plan. Do the designers do anything about it? A few have—most haven't.

The fire hazard? Planes have been burning up for years to the very great detriment of aviation. The engineers have heard about this, but they haven't eliminated it.

Wheels and undercarriages sap an engine's power to drag them through the air. Every designer knows this and yet most of them have consistently failed to work out a method of folding them out of the way in flight.

How far have the engineers progressed with that low-priced, fool-proof plane for the ordinary citizen? Most of them say such a plane can't be built. It must be built if aviation is ever to become an important industry.

Where is the plane that can carry cargo and passengers at a price the public can afford to pay?

Nobody has produced a plane with a very high flying speed and a very low landing speed, an admittedly ideal combination.

But why go on?

For your own amusement compare the progress made in airplane development with that made during the past few years in radio, talking motion pictures, a dozen other scientific industries. Come to think it over, the automobile is not much older than the airplane!

Our own designers would do well to consider all that.

Then after a few more rude remarks he makes some very sensible suggestions about what American aviation ought to do to be saved.

Here is his remedy:—

If anyone is interested in the opinion of one broken-down old birdman, here is what I think aviation business should do:—

It should come out of that stockbroker's office, go home, put on its overalls, spit on its hands, and go to work. It should fire all its press agents, most of whom act as if they had just been bitten by a mad airplane.

It should, for instance, stop talking about trans-Atlantic air-lines until it produces a 'plane that can carry passengers and cargo across the Atlantic safely and regularly, day in and day out—at a profit. No such plane exists to-day.

It should start thinking seriously about the overwhelming percentage of Americans who do not fly. It should kick some engineers squarely and soundly in the seat of their trousers and tell them to get to work and really accomplish something—or get out.

It should realise that for years aviation has always been one great big unfulfilled promise, has lived in a perennial to-morrow. It should also realise that until it gives the public something it wants, needs, and can afford to buy, the public will not buy it. It should appreciate that what it needs is not bankers with money but inspired, creative engineers.

It had better do all these things pretty soon, or else—!

What Mr. Rogers has written applies nearly enough to British Aviation to make it very well worth studying. Happily we have not had a colossal financial boom in aviation the way they have in the States and consequently nobody has lost any money worth mentioning in British aviation. Therefore when the aviation boom does come we shall not have investors fighting shy of investments in aircraft firms. To that extent we have the advantage over America. But before we start booming aircraft businesses let us produce commercial aircraft as he suggests. As THE AEROPLANE has preached for years, the only way to make any business pay is to give the public what the public wants. When we do that aviation will, as Mr. Churchill said, fly by itself.—

C. G. G.

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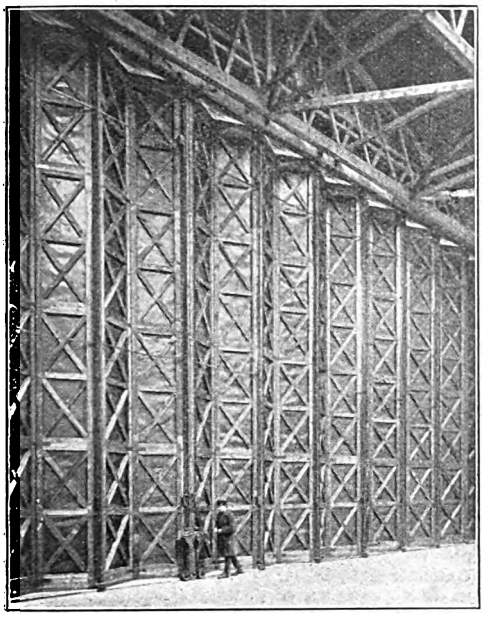
# THE DOORS FOR THE MODERN AEROPLANE HANGAR



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Capt. Hinkler's Flight in light 'plane from England to Australia in 15½ days.
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*vide "Wessex Airways."*

# THE SPARTAN ARROW

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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### CREDITABLE FAILURE.

On Dec. 3. Miss Winifred Spooner and Mr. E. C. T. Edwards, R.A.F., set out from Croydon Aerodrome in a Desoutter monoplane (D.H. Gipsy III) on an attempt to fly to Cape Town in five days. The plan was to fly night and day, one of the pilots to be sleeping while the other flew the machine.

The programme involved flying some 2,000 miles every twenty-four hours. An extra petrol tank had been fitted which brought the fuel capacity to 70 gallons and gave the Desoutter a range of 1,200 miles. The rear of the cabin had been fitted with sleeping accommodation and among the baggage were a bundle of copies of THE AEROPLANE for Cape Town and packages of certain other newspapers for recipients there and at intermediate points.

The machine landed at the Littorio Aerodrome, Rome, the same evening, and after a meal the two set off once more with Mr. Edwards at the controls. They planned to land at Catania, Sicily, and thence to take off across the Mediterranean. Unfortunately they came down in the sea.

Miss Spooner, in a Press interview, said that she slept for about three hours and woke up to find that they were flying through fog. They exchanged comments on their position and progress and Miss Spooner declares that she read the altimeter as at 11,000 ft. just a few moments before the machine hit the water. She escaped through a window from the cabin, which was rapidly filling up, and struck out towards the shore lights. She then turned and called Mr. Edwards and understood that she heard him reply, although actually he had not heard her but was doing a little shouting on his part. Miss Spooner thereupon advised him to swim for it and herself swam to shore, which took two hours.

This story does not agree with another story to the effect that they both sat on the machine for an hour or two, and that then, as there was no answer to their shouting, Miss Spooner swam ashore for help, as Mr. Edwards was unable to do so.

She roused people with some difficulty, but the village of Belmonte and its inhabitants seem to have risen to the occasion when once they understood its urgency. Two out of the three local fishing boats were launched for the search, and when one came back without Mr. Edwards Miss Spooner insisted on setting out again in it. Fortunately they met the other one with her co-pilot on board. Both had slight facial injuries and were thoroughly wet and chilled, but otherwise seemed to be unhurt.

Thenceforward the work of rescue and salvage was much like any other salvage-rescue story, with the wearing of borrowed clothes, hospitable entertainment, telegrams and so on. Between them the adventurers took the engine out of the salvaged monoplane, which, according to pictures, seems to have encountered the Marine Mind. Incidentally the originally reported engine-failure was a mistaken rumour, and whatever is decided about the real cause of the mishap the weather seems to have been a primary factor.

The Desoutter was rather badly damaged by the impact and the immersion, but its pilots regard it as repairable and are inquiring about the possibility of using the soaked portions again after drying them.

The occurrence is, of course, regrettable in every way, but is much less serious than it might so easily have been. To hit the water unawares without being killed immediately is a piece of luck, and Miss Spooner's remarkably fine swim probably saved both the travellers from drowning, because she herself might have been in no condition to stay such a course after sitting on the machine for some hours.

According to a newspaper story, on the second afternoon after the accident a trawler got Miss Spooner's log book in its net while fishing about five miles north of Belmonte. A cheque in her favour for £410 is also alleged by *The Daily Telegraph* to have been in the book. The Italian authorities passed on the documents to their owner. The idea of any aviator in these times having £10, let alone the other £400, and the idea of a long-shore pirate voluntarily surrendering anything that came into his net suggests that the story is improbable.

On Dec. 5 General Balbo, the Italian Air Minister, sent the following telegram to Lord Amulree, Secretary of State for Air:—

"The two sufferers are enjoying cordial hospitality of Mayor of Belmonte and surrounded by every care. Aircraft is on beach awaiting dismantling. Acting on my instructions an officer of the Royal Italian Air Force left Naples air station by air at dawn this morning to place himself at disposal of pilots for anything they may require. Assure you that they will be given every assistance as long as required by Royal Italian Air Force and local authorities."

Lord Amulree has sent the following reply to General Balbo:—

"Please accept my cordial thanks for the ready assistance which you have rendered to Miss Spooner and Flying Officer Edwards. Your action is yet another example of the happy relations subsisting between Italian and British aviation."

### A FAST COMEBACK.

MM. Lalouette and Goulette, with M. Pasquier, Governor-General of French Indo-China, arrived at Marseille on Dec. 6 in the Farman 190 monoplane (Lorraine 240 h.p. engine) on their return journey.

Considering that fog prevented the continuation of the journey to Paris the finish of the flight may not convey its full excellence. Their journey to Saigon in barely more than five days was remarkable, but they returned, carrying their distinguished passenger, in five days and sixteen hours as far as Marseille. M. Pasquier was said to have urgent business in Paris. We trust he is satisfied.

### A FRENCHWOMAN'S PROGRESS.

On Nov. 12 Mlle. Maryse Hilsz set out from Paris in a Morane Moth (Gipsy I engine) to fly to Saigon alone. Her steady and consistent flying is reflected in the following daily log of progress:—

Nov. 12, Paris-Marignane; Nov. 13, Marignane-Gorizia; Nov. 14, Gorizia-Belgrade; Nov. 15, Belgrade-Constantinople.

Nov. 16, Constantinople-Konia (Mlle. Hilsz was delayed here by weather for 48 hours); Nov. 18, Konia-Aleppo; Nov. 19, Aleppo-Baghdad; Nov. 20, Baghdad-Basra.

Nov. 21, Basra-Jask; Nov. 22, Jask-Karachi; Nov. 23, Karachi-Allahabad; Nov. 24, Allahabad-Calcutta.

Nov. 25, Calcutta-Rangoon. A leak in the petrol tank at Rangoon caused considerable delay and was not finally repaired until Dec. 3.

Dec. 4, Mlle. Hilsz left Rangoon for Bangkok.

### A FINE SOLO FLIGHT.

The following letter sent by Van Houten Ltd., the famous cocoa firm, to The De Havilland Aircraft Co. Ltd., tells of a very fine solo flight to the Far East. It is certainly the longest purely business flight on record.

Sirs,—Confirming our conversation on the telephone to-day we are pleased to be able to advise you that our Export Manager, Mr. J. F. van Tyen, for whom you recently equipped a Pander aeroplane fitted with a D.H. 120 h.p. engine, has reached his destination at Batavia, Dutch East Indies, after a flight from Amsterdam.

We believe that Mr. van Tyen is the first business man to fly solo machine from Holland to the Dutch East Indies, and his flying time of about 145 hours demonstrates the absolute reliability of this method of travel. The journey of about 8,500 miles was made without any untoward incident, and to schedule time with the exception of one or two delays on account of inclement weather.

We are advised by the Vaz Dias News Agency this morning that after reaching Batavia, where he received an enthusiastic welcome from a very large crowd, Mr. van Tyen flew on to Bandoeng accompanied by seven machines. He is returning to Batavia later for various official and Government receptions.

The flight has received some notice in the British Press, but has been recorded daily in the Dutch Press and on the Dutch broadcast. In all our arrangements, due recognition has been made to the de Havilland engine.

We should like to take this opportunity of thanking you for the very courteous assistance and help which you rendered to Mr. van Tyen when he was in England in September last, and if there is any further information in connection with the flight which might be useful to you, we shall be glad to let you have it if you will kindly let us know.

Mr. van Tyen himself cabled the De Havilland Co.:—

Perfectly satisfied Gipsy engine stop spares unused stop only daily adjustments requirements.

[Evidently the Pander aeroplane was without a *panne de moteur*.]

### THE BROOKLANDS SCHOOL.

The flying hours during the month of November at the Brooklands School of Flying Ltd., amounted to ninety. The last fortnight has seen a decrease in the flying hours owing to the bad weather; consequently several pupils are waiting for the blue sky to do height tests, etc.

The Directors are pleased to announce that the Ground Engineer's Course is now in full swing and that it is being supported by several well-known private owners and budding ground engineers. Full particulars can be obtained upon application to the Brooklands School of Flying.

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### GERMAN AEROPLANE AT LYMPNE.

On Friday, Dec. 5, Mr. W. J. Farquharson, a South African, descended out of the fog at Lympne in a new Espenlaub high-wing monoplane, with a Cirrus III engine, accompanied by the designer himself. The aircraft is most beautifully constructed and finished in varnished wood, and was built at Düsseldorf. The tail design is peculiar, and it would appear that the rudder cannot be very efficient owing to its proximity to the back of the pilot's cockpit. The machine appears to be very fast and to have an astonishing climb. Mr. Farquharson, who is a member of the Johannesburg Light Aeroplane Club, has joined the Cinque Ports Club during his stay in England, and the Espenlaub has caused much interest.

Unfortunately, on Dec. 8 Mr. Farquharson took out the Espenlaub in somewhat gusty weather, took it off and apparently stalled in a climbing turn. Mr. Farquharson suffered severe facial injuries, and the Espenlaub was completely flattened out on the aerodrome fence.

### THE BRISTOL CLUB DINNER.

On Thursday, Nov. 27, the Bristol and Wessex Aeroplane Club held a "bachelor" dinner at the Grand Hotel, Bristol, to which the three previous secretaries of the Club were invited as the guests of the Club. The dinner was a great success, and was followed by an impromptu entertainment in the form of a sing-song.

The presence of the three previous secretaries recalled the early days of the Club when it first came into being at Filton. The first to take charge of the Club's affairs was Colonel G. Flemming, O.B.E., M.C., who is well known in West of England political circles. Colonel Flemming took on the duties of Honorary Secretary from the date that the Club was formed.

He handed over control to Captain C. F. G. Crawford, affectionately known as "Uncle Dick," who was the first paid secretary. Then came Major Gordon Cooper, D.S.O., who was the last of the line of secretaries at Filton. Major Cooper is now in charge of the new West Sussex Golf Club at Pulborough, and when leaving to take up this new appointment in February last he was relieved by Captain L. P. Winters, the present Manager of the Bristol and Wessex Club.

### A MATTER OF ECONOMY.

The following information may be valuable:—

Sir,—May I, through your columns, give a warning to pilots who may be contemplating a visit to Cambridge? Having occasion to land at a civil aerodrome near there in my Avro Baby a short time ago, I was charged a landing fee of 2s. 6d. At State-owned civil aerodromes I pay 1s. as landing fee.

(Signed) H. R. A. EDWARDS.

[Whether landing at Duxford to save 1s. 6d. would be true economy is for the pilot to decide.—ED.]

### THE PERVADING PUSS-MOTH.

The Queensland and Northern Territories Air Services Ltd., the well-known Australian air transport company, which is perhaps better known as the Quantas company, has acquired a D.H. Puss-Moth, and the machine has already proved its worth as a small, fast, emergency transport aeroplane.

In one case a sick child, urgently in need of help, was flown 85 miles, from Warwick to Brisbane, in 45 minutes, and a relative of the child was carried as passenger. The child and mother were flown back to Warwick after the necessary medical treatment. This trip against a strong head wind was completed in one hour. The pilot was forced to climb to 8,500 ft. to get over a heavy cloud-bank, but the use of the cabin heater overcame any likelihood of discomfort from cold.

On a later occasion this machine put up fastest time at the Lismore Aerial Pageant, averaging over 120 m.p.h. By 15.15 hours next day the machine had reached Townsville, 830 miles away, on an urgent trip, and by 18.00 hours the following day it had reached Brisbane after having flown a further 730 miles at an average speed of 111 m.p.h. with an urgent hospital case.

### A NEW CLUB HOUSE IN THE MIDLANDS.

The Midland Aero Club opened its new club house at Castle Bromwich Aerodrome, Birmingham, on Dec. 7. This Club has been in operation since 1925 and was originally formed in 1919, and its 450 members have now built new premises at a cost of £600.

### TO-DAY'S EMETIC.

A photograph submitted by a news-agency shows a two-seater aeroplane with two females grinning and waving out of it, and inscribed "Ta-ta! Sorry there isn't room for another." An excellent example of how *not* to advertise.

### WANTED.

Will any reader who has a copy of THE AEROPLANE of Jan. 23, 1918, to spare communicate with the Office of THE AEROPLANE, 175, Piccadilly, W.1, stating his price?


# Two Weeks To Christmas

*The following books are recommended by the Staff of THE AEROPLANE and may therefore be bought with confidence and presented without shame.*

| Post Free | £ | s. | d. |
|---|---|---|---|
| **All the World's Aircraft, 1930** - - (Ready late in December. A record of Service and Civil Aviation in all Countries and of the aeroplanes, engines and airships of all nations.) | 2 | 2 | 9 |
| **Wind and Water** - - - (Photographic Studies of effects of air on sea.) | 1 | 6 | 0 |
| **The Air Annual of the British Empire** (A Review of British Aviation). | 1 | 1 | 9 |
| **Fights and Flights** By C. R. Samson - (Personal experiences of war on land and sea.) | 1 | 1 | 6 |
| **The Fourth Seal** By Samuel Hoare - (Experiences in Russia.) | | 15 | 6 |
| **Scarlet & Khaki** By T. B. Marson - (Reminiscences of Hunting and War.) | | 10 | 9 |
| **Flying Fury (Five Years in the R.F.C.)** By J. B. T. McCudden (The whole art of air fighting.) | | 9 | 0 |
| **Into the Blue** By Norman MacMillan - (A fighting pilot in France.) | | 9 | 0 |
| **Royal Flying Corps Headquarters** - By Maurice Baring (Air-war as the Staff see it.) | | 8 | 9 |
| **Solo to Sydney** By F. C. Chichester - (The story of a lone flight.) | | 8 | 6 |
| **Contact** By E. White Springs - - (More War-Birds.) | | 7 | 9 |
| **Ordeal by Air** By J. S. Hughes - (An R.N.A.S. Adventure.) | | 7 | 9 |
| **Missing** By T. B. Bruce - - (Adventures behind the lines.) | | 5 | 3 |
| **War Birds** - - - - - (The Diary of an Unknown Aviator.) | | 3 | 9 |

*These books and many others may be had from:*

**The Aeroplane Book Department,**
CANNON HOUSE,
PILGRIM STREET, LONDON, E.C. 4.

*(Orders amounting to £5 post free to any part of the World)*


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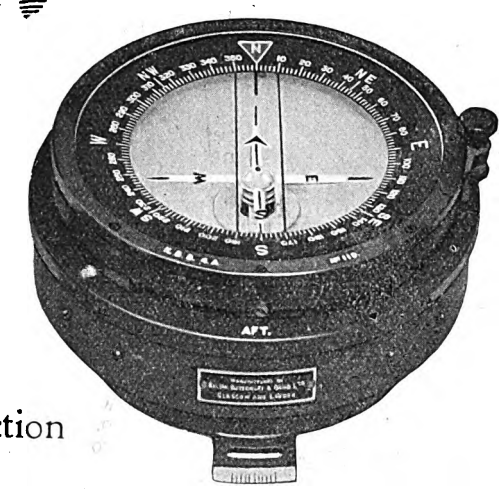
# R.B.B. Compasses *for*




## Non - Periodic

*i.e.* If the Magnet - System be deflected to any angle and be then released it overswings the position of equilibrium once only by a few degrees and then promptly returns to its position of rest.

Extremely **Quick & Dead-Beat** in Action

Luminous & Non-Luminous

**Made in two sizes for Solo Flying and for Passenger 'Planes.**

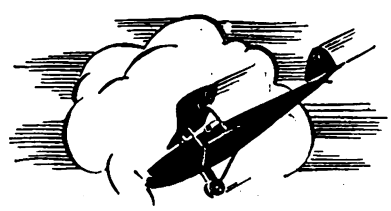
Approved by Air Ministry for Civil Aviation

[*Please write for Illustrated Brochure.*]

**KELVIN, BOTTOMLEY & BAIRD, LTD.,**
**18, Cambridge Street, Glasgow.**
Imperial House, 11-15, Air Street, Regent Street, London, W.1.

# FLY ALL THE YEAR

## A "HUNTERISED" FLYING GROUND MEANS VELVET SMOOTHNESS AND 100% FLYABILITY



EFFICIENT LAND SURFACING OF RECLAIMED BOG, HEDGE AND TIMBER CLEARING, AND CONSTRUCTION THROUGHOUT OF AIRPORTS AND PRIVATE FLYING GROUNDS BY

# HUNTER'S OF CHESTER

JAMES HUNTER LTD., CHESTER AND HESTON AIR PARK

*Telephones—754 CHESTER (5 lines) and HAYES 410 (5 lines).*

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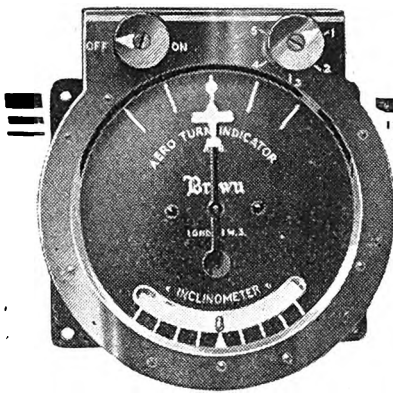
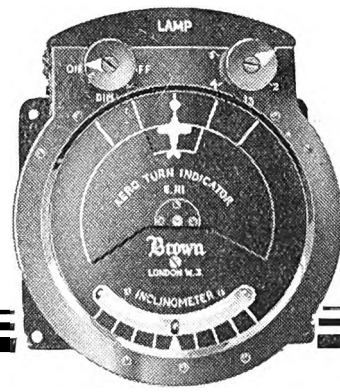
# de Havilland chooses the Brown Aero Turn Indicator for the famous Puss Moth




Within the few months the Brown Aero Turn Indicator has been on the market, it has met with swift success. Leading aircraft companies are equipping their machines with it—the latest is the de Havilland company which has chosen it for their famous Puss Moth. The reason is because the Brown Aero Turn Indicator has been proved to give greater accuracy in flight, to remove risks in fog, and to ensure a straight course by day or night.

Two Models.

The two types of the Brown Aero Turn Indicator are illustrated here. Model A (above) is air driven, and Model B is battery operated. The gyroscopic principle adopted is identical in each type. Used in conjunction with the ordinary compass, the instruments warn the pilot instantly when he is turning off his course, by means of the pointer which moves to the left or right. In addition, in the electrical model a red or green light appears. Every instrument is fitted with a control permitting five different settings for sensitivity.




# Brown
## AERO TURN INDICATOR

S. G. BROWN, LTD.,
Western Avenue, N. Acton, London, W.3.

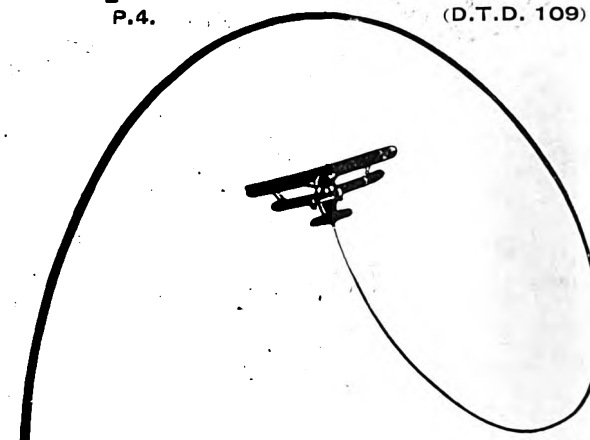
*Made by the Makers of the Only British Gyro Compass.*

♡6885



*Silvertown*
# Speedolene

P.4. (D.T.D. 109)



*The Superlative Aero-Engine Oil*

USED AND APPROVED BY BRITISH AERO-ENGINE BUILDERS

***Silvertown Lubricants Limited***
Minoco Wharf West Silvertown E 16
Grams Volumetric Silver London Phone Albert Dock 1074

*SPEEDOLENE P.4 IS ISSUED UNDER A.I.D. RELEASE NOTES.*

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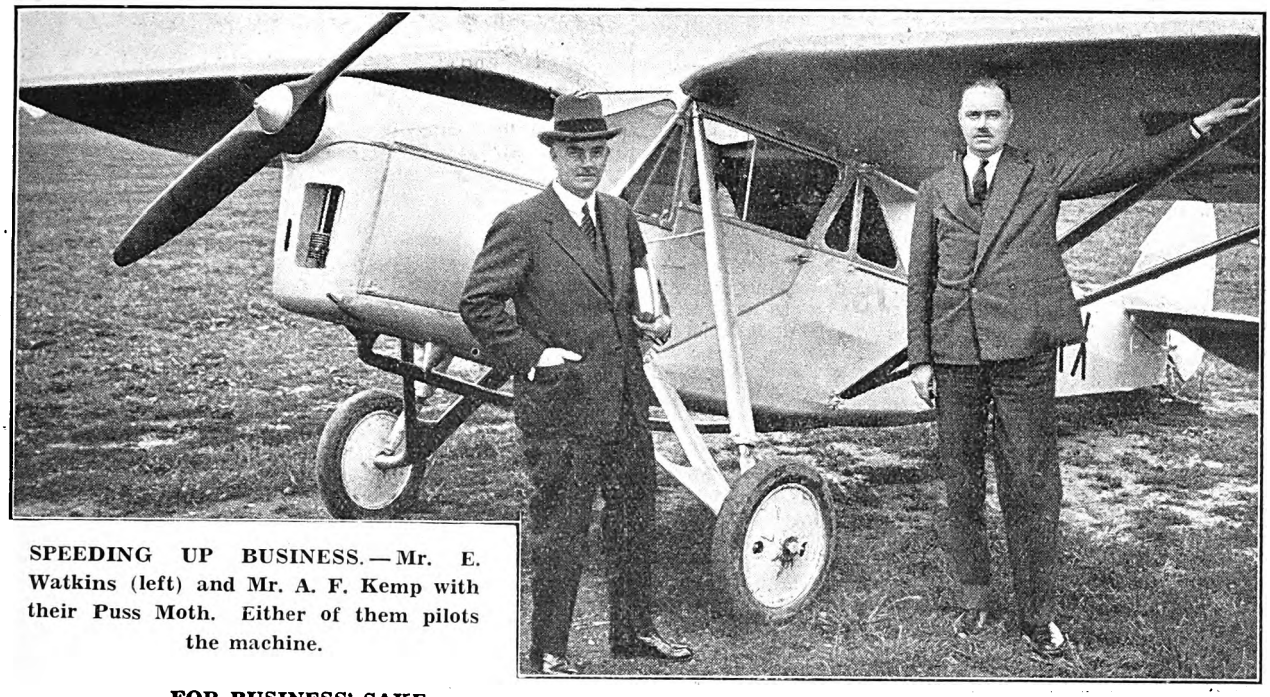
# TRADE NEWS



SPEEDING UP BUSINESS.—Mr. E. Watkins (left) and Mr. A. F. Kemp with their Puss Moth. Either of them pilots the machine.

### FOR BUSINESS' SAKE.

Mr. Eustace Watkins, who is managing director of the well-known firm of motor-car distributors of that name, declares that he has not used a train for business purposes for six months—that was before the fog came down—and his statement does not imply a fondness for motor-'buses. He owns a Puss Moth.

Mr. Watkins, and his co-director, Mr. A. F. Kemp, whom we understand to be the pilot, use the machine for inland business trips as well as occasional journeys abroad. They make a weekly flight to Birmingham and average about 45 minutes each way, although the proverbially rare following wind once allowed them to set a record of 35 minutes on the way back.

Going to Lincoln recently Mr. Watkins was able to do the double journey, as well as his business there, in the time which a one-way train journey would have occupied.

They were held up once by the weather, on the fateful Oct. 4 when the World knew of the storm the following day from descriptions of the R.101 disaster. Mr. Watkins came from Paris through the storm over Beauvais late in the afternoon and he and his partner were later forced down by the weather at Treport. They reached Abbeville the same evening.

### POBJOY PROGRESS.

The many people who are interested in watching the development of that unusual engine the Pobjoy will be glad to hear that the production of the engine is progressing very satisfactorily and that the firm hope to be ready with deliveries before long.

Some quite valuable information has been got from the very first Pobjoy ever made. This engine was sold to the Nicholas Beazley Company in America, where it has done some sixty hours' full-throttle running, mostly racing. It never gave the slightest trouble, except a little carburation trouble in the racing machine, which as an unknown quantity produced induction problems similar to those which we have had in practically all racing machines. This engine has just arrived at the firm's works at Hooton, Cheshire, where it will be overhauled and carefully examined for signs of wear and tear.

The recently-built Pobjoy engine which has been flying in a Comper Swift for several months is steadily piling up hours and is putting up an excellent performance. One of its most striking features is its almost uncanny silence. It gives the impression that it is being flown throttled back until suddenly the machine points its nose skyward and climbs like a scout at about 1,400 feet a minute.

### FOLDING BOATS AND FLOATS.

The Hudson Folding Boat and Engineering Company, Ltd., which builds such craft as are suggested by its title on designs for which Mr. R. J. Harrington Hudson holds the patents, has recently turned its attention to aeroplane floats.

The same patents will cover the design of floats which can be folded up and—presumably—carried in the aircraft, but still be perfectly watertight when submerged.

Folding boats, of wood or aluminium alloy, for use as aircraft tenders are now under test, and their construction follows the same principles as that of the dinghys, produced in various forms, which are now being built under the Hudson patents.

### PUSS AND BOOTS.

Mr. Thomas Bata, who is the uncrowned king of Zlin, Czecho-Slovakia, by reason of having established there the largest boot and shoe factory in Europe, has ordered two Puss-Moths. They will leave for Zlin shortly, piloted by Mr. H. S. Broad and one of his colleagues.

Mr. Bata became interested in this type of aeroplane when a Puss-Moth visited him some time ago with the late Sir Sefton Brancker, and Mr. C. A. Pike, of the De Havilland Aircraft Co. Ltd. Whether he despaired of making seven-league boots to compete with it, or wished to try a reversal of the well-remembered legend, information does not make clear, but cargoes of Boots in Puss may be expected in the news within a month.

### BUENOS AIRES.

The Committee of the Royal Aero Club has granted permission for the Schneider Trophy to be exhibited in the British Aeronautical Section of the British Empire Trade Exhibition, to be held at Buenos Aires from Mar. 14 to April 27, 1931.

### FROM AMERICA.

*Susie*: "What is a monoplane?"
*Sammy*: "An aeroplane with only one wing."
*Susie*: "Which side is it on?"

MALLITE PLYWOOD
USED BY THE LEADING AIRCRAFT MANUFACTURERS THROUGHOUT THE WORLD.
TELEPHONE: BISHOPSGATE 5641 (4 LINES)
MANUFACTURED TO SPECIFICATION D.T.D. BY
THE AERONAUTICAL & PANEL PLYWOOD Co. LTD. 218/226, KINGSLAND RD. LONDON. E.2.
TELEGRAMS: VICPLY, KINLAND, LONDON.

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### THE BRITISH AIRCRAFT ISSUE.

Readers of THE AEROPLANE who have read about but have been unable to get copies of the British Aircraft Industry Issue of THE AEROPLANE are informed that a few copies can still be had from this office price 1s. post free. A certain number in excess of requirements were deliberately printed with this idea in mind and most of them have gone.

### AN INVESTMENT OPPORTUNITY.

A company which has operated aircraft for several years and had a very successful season of joyriding, taxi trips and general work during the past season is contemplating a scheme of expansion. An investor, with or without employment, is needed by this concern, and any such who wish to learn more can do so by applying through THE AEROPLANE, 175, Piccadilly. Letters should be marked "Home Service."

### THOSE K.L.G.'s AGAIN!

K.L.G. Sparking Plugs Ltd. are justly proud of the fact that Flt. Lt. C. W. Hill used K.L.G. Plugs in his gallant attempt to beat Sq. Ldr. Hinkler's record flight to Australia, and we are therefore very pleased to receive the under-quoted note from him recently:—

I am writing to say that the K.L.G. Plugs used during my flight from England to Timor gave me entire satisfaction. I used the original set throughout the whole journey and the engine ran perfectly. My flying time was 122 hrs. 15 min.

### SHEDS FOR THE LIGHT AEROPLANE.

The natural sequence to buying a dog is the purchase of a kennel for him, in fact some people buy the kennel first and then buy a dog to fit it. In the same way the owner of an aeroplane must immediately think about a shed for it. The day is now past when an aeroplane was garaged in a tent, barn, or any temporary building large enough to fit it. Aeroplane owners, whether they be private owners or the members of a club, want sheds for their machines that are scientifically constructed, durable, and not unsightly.

To get the sort of shed that they require owners cannot do better than consult Nissen Buildings Ltd., of Rye House, Hoddesdon, Herts, whose works are equipped to undertake all classes of structural steelwork and are so situated that they can afford prompt and economical transport and delivery.

Nissen Buildings Ltd. have had many years' experience of steel structural work, as is well known to all who served in the War 1914-18, and their buildings have been erected all over the world.

Nissen buildings consist of a series of arched steel ribs spaced at a uniform distance apart, carrying purlins either of timber or steel secured by galvanised hook-bolts in the case of timber, or by the ordinary method of cleats where steel purlins are used. These ribs are of "T" section for spans up to 40 feet and light "H" section for larger spans. The standard roof-covering is galvanised corrugated steel, but alternative forms of roof covering can be used. Although an inner lining of galvanised corrugated steel forms part of the standard construction, it can be omitted without affecting the weather-proof qualities of any Nissen building. An important feature of the Nissen patent construction is that independent side walls are not required. The clear, uninterrupted floor area over wide spans makes the Nissen buildings particularly valuable as aeroplane sheds.

No club or private owner should build a shed without investigating the possibilities of Nissen Buildings.

### MANY INVENTIONS.—(Dec. 8.)

Hannen Swaffer, we notice, distributes biscuits to his readers just as John Bull used to do. Hannen's biscuits are not digestive, and taste strongly of bitumen no doubt, and are thus liable to lead to head punching in eating houses, and the like. Our biscuits are eminently digestive, and are even of charcoal. They closely resemble the best ebonite in taste, texture and appearance, and this week's, a hand-carved ship's biscuit suitable for a door step, or as an ornamental adornment for the ancestral what-not, is awarded to the Editor of a well-known Aviation monthly paper, for taking a boat on his homeward journey from Paris recently, instead of trusting to aviation.

About the time the Imperial Airways Silver Wing and the Air Union Golden Ray landed at Croydon after a swift flight from Paris, the said Ed. was marooned in a thick fog somewhere in the Channel along of the mariner's compass on the Captain's watch-chain getting a drop of soup in it, which subsequently congealed. There they stayed for forty-eight hours, whilst brigantines and barques, not to mention barges, bumped into them, and the ship's band played "Many Brave Hearts are Asleep in the Deep," "Britannia Rules the Waves," and other nautical selections, to cheer them up.

Another biscuit goes to the Marconi Company for advertising their valves in the daily papers with a sketch of the curious and quite useless fumed oak clock tower in the middle of the central hall at Croydon. This is studded with clocks which don't go and cannot even tick, and in the picture a uniformed official was mournfully regarding one of these clocks and wondering why it has been 10.25 hours by several of the clocks ever since approximately the same time of day yesterday. Under this lively sketch appeared the legend "The Croydon Control Tower uses Marconi Valves for keeping in touch with aircraft." When biting into our presentation slab of charcoal, the London Marconi gent responsible for this advertisement may pause (a) to remove a broken incisor and (b) to reflect that if he himself does not know the Control Tower when he sees it, the highly intelligent Marconi staff at Croydon Aerodrome would be delighted to point it out to him.

In *The Times* personal column, two Aviators, 25 and 30 years of age, financially embarrassed, offered recently to take chances of any kind at home or abroad. We believe the finncially embarrassed who delight in taking chances at home often experience instant relief if they cross Piccadilly Circus widdershins or anti-trafficwise, with their eyes shut during rush hours, and a similar fate (or one just as bad) is said to have overtaken a taker of chances in Italy who hurled a Spanish omelette at Mussolini when that desperate character was making one of his amusing little war speeches.

Another advertisement in the personal column of *The Times* recently urged Friends of British Aviation to purchase genuine antiques in aid of the Air League of the British Empire from a certain address in Weymouth Street. Our efforts however to buy a well-known type of air-liner were met with a rebuff and the shop people tried to fob off a model of a Spanish galleon onto us instead, assuring us that it practically amounted to the same thing.

Last week several constant readers will have been saddened by our Mr. Larry Larkspur (ours no longer, alas!) leaving the lexicon in the lurch, but we are now able to announce that a certain Mr. Bipphord Barman has slipped into the vacant chair. Our Mr. Barman says he has for a long time desired to have some really useful niche in Aviation, and we think he will answer admirably but for a faint queer accent difficult to place, but probably due to gum chewing. His only fault seems to be that he has a pantechnicon follow him around, full of bronze trophies which he presents to strangers on the slightest pretext such as meeting a man with goggles strapped onto his bowler hat.

Five minutes ago, we suggested that a slightly damaged Winged Victory with one leg should be carried to THE AEROPLANE offices and presented to the Editor as a token of esteem, and even as we write nervous members of THE AEROPLANE staff are probably being alarmed by a brazen clanging noise indicative of our Mr. Bipphord Barman and the Winged Victory (which is life-size) getting wedged in the Nogood Waites lift.

When not busy juggling with trophies, our Mr. Barman is getting along nicely with the Lexicon. Here are his latest efforts:—

*Air Port, London, of*:—Quaint architectural experiment built of cement blocks, having the natural porosity of the common or bathroom sponge. In wet weather the inhabitants closely resemble poor fish in an aquarium, causing infinite amusement to visiting Air Ministry officials. The Air Port may be visited after obtaining permission from the Society for the Preservation of Ancient Monuments, when an official guide with an umbrella and an amphibious temperament will show the moist and crumbling remains to visitors (for parallel cases see Holy Roman Empire, decline and fall of, and Pompeii, last days of).

*Aerohgawd.*

Expression often used by air-minded travellers on first tasting the aerated waters supplied with luncheon baskets.

In *The Daily Sketch* of Dec. 8 there is a story of how some fishermen in Italy picked up an aviation magazine inside which was found a fat cheque belonging to Miss

Fit "TripleX" Reg'd -and be safe!
TRIPLEX PLATE TRADE MARK REGISTERED
TRIPLEX SHEET TRADE MARK REGISTERED

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# AEROGRAPH

for Spray Guns for all purposes, Pressure and Gravity Feed Containers, Air Regulators, Air Compressors and Receivers, Air and Fluid Tubing, Spray Booths and Exhaust Fans.

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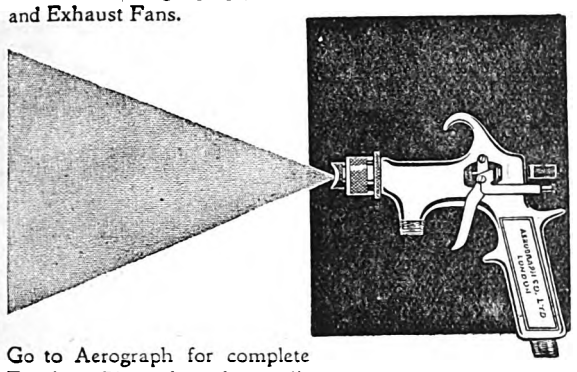

Go to Aerograph for complete Finishing Plants from the smallest hand-operated outfit to the largest industrial installations, including cleaning and preparatory equipment of all kinds.

*Let us solve your 'finish' problem —write now without obligation to:*

**AEROGRAPH CO. Ltd.**

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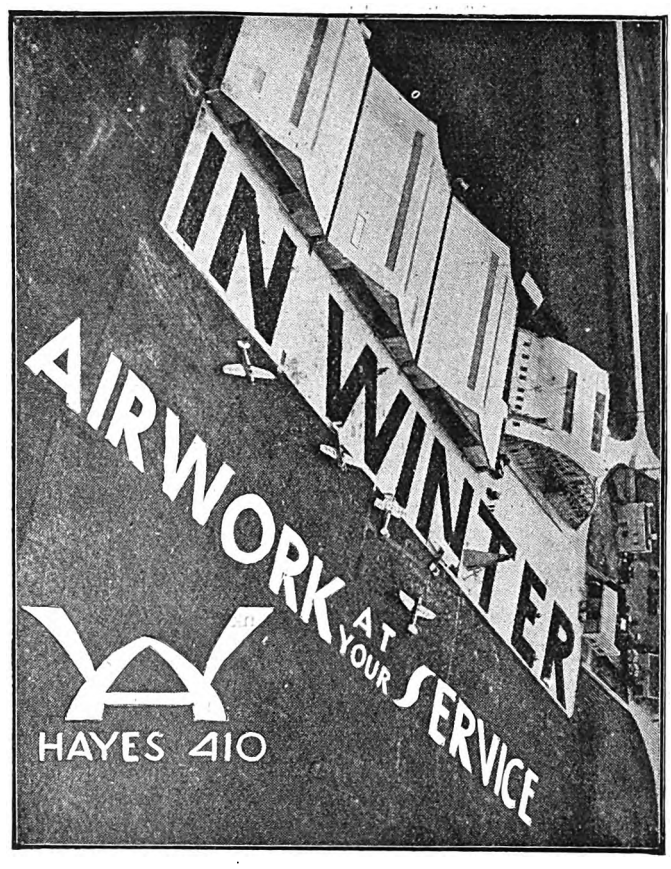
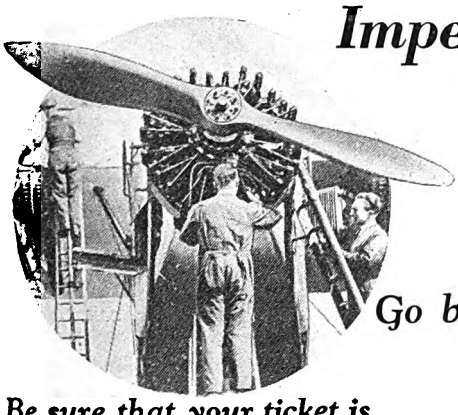



# *Imperial Airways Ensures Reliability*



THE latest statistics shew that Imperial Airways Expresses are maintaining an all-the-year-round dependability of well over 90%. One of the secrets of this reliability is the system of overhaul and maintenance. Before each flight the great 'Silver Wing' air-liners are carefully examined and overhauled by Imperial Airways engineers. You are as sure of reaching your destination on time in an Imperial Airways 'plane as if you travelled by Pullman, and much quicker.

*Go by*

# IMPERIAL AIRWAYS

*Be sure that your ticket is marked 'Imperial Airways'*

Bookings and information from any Travel Agency or direct from:—
AIRWAYS HOUSE, CHARLES STREET, LONDON, S.W.1.
*'Phone: Regent 7861 (Night & Day).* *Grams: Impairlim, London.*

C.F.H.

# TITANINE

THE WORLD'S PREMIER

GIVES CONSTANT TAUTNESS IN ALL CLIMATES

# DOPE

Factories:-
Hendon (London, N.W.9)
New York (U.S.A.)
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Telephones:-
Gerrard 2312.
Regent 4728.
Telegrams & Cables,
"Tetrafree, Piccy, London."

TITANINE-EMAILLITE, LTD., 175, PICCADILLY, LONDON, W.1.




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Spooner, which shows that when you go swimming, you should always take your aviation magazine with you. But that's nothing. You should see the banknotes that flutter out of our copy of The Aeroplane when we open it of a Thursday morning—Coo!

Maybe it has not much to do with Aviation, but the following is a matter in which all aviationists will be interested. A week or two ago the papers reported that a Band of Hope singing "Good King Winceslas," changed the line "Bring me flesh and bring me wine" into "Bring me flesh and ginger wine," which was splendid so far as it went, from a Band of Hope point of view. Inquiries at the Aerodrome Hotel however elicited the information that ginger wine could on no account be sold outside licensing hours, and within them but sparingly. Apparently not a drop of this viscid intoxicant is sold until it is seventy years old and there is a headache in every half noggin. The Band of Hope knows its own business best of course, but if the ginger wine and flesh habit spreads, our carols will we fear fall to pieces, and we shall get this sort of ribaldry at Yuletide:

Good King Wenceslas set out,
On the feast of Stephen,
When the pavements swayed about,
Sloping and uneven.

Catch yon lamppost, good my Page,
Stop it as it passes,
Onions mix all right with sage,
Not so port with basses.

Fetch a taxi, Page o' mine,
One with triple motors,
We will seek a nobler wine,
Ginger wine (with bloaters).

## MORTGAGES AND CHARGES.

British Indestructo Glass Ltd.—Debenture dated Nov. 4, 1930, to secure £2,198, and further advances up to a total of £5,000, charged on factory, land and premises at the Chase Estate, Park Royal, Acton (subject to the existing charge dated June 24, 1929), with factory thereon, known as No. 30 Factory, and the company's undertaking and property, present and future, including uncalled capital. Holders: British Safeglass Ltd., 1, Queen Victoria Street, E.C.4.

## PERSONAL NOTICES.

### Births.

MANNING.—On Dec. 4, 1930, at Hornchurch, Essex, to Phyllis, wife of Wing Cdr. Edye R. Manning, D.S.O., M.C., R.A.F.—a daughter.

MOLLER.—On Nov. 28, at Quetta, to Betty, wife of Christopher Moller, R.A.F.—a son.

SCOTT.—On Dec. 1, 1930, at Manor House, Cotton End, Bedford, to Jess, widow of Major George Herbert Scott, C.B.E., A.F.C.—a daughter.

### Forthcoming Marriage.

CARR—ELKINGTON.—A marriage has been arranged and will shortly take place between Sq. Ldr. Charles Roderick Carr, D.F.C., A.F.C., eldest son of Mr. and Mrs. Charles Carr, of Rotorua, New Zealand, and Phyllis, younger daughter of Mr. and Mrs. C. S. Elkington, of Red Lodge, Amersham.

KEARY—GORDON.—A marriage has been arranged, and will shortly take place between Sq. Ldr. Charles R. Keary, younger son of the late Mr. Henry Mee Keary and Mrs. Keary, and Margaret, elder daughter of Mr. and Mrs. H. V. Masefield, of 1, Drayton Gardens, S.W.

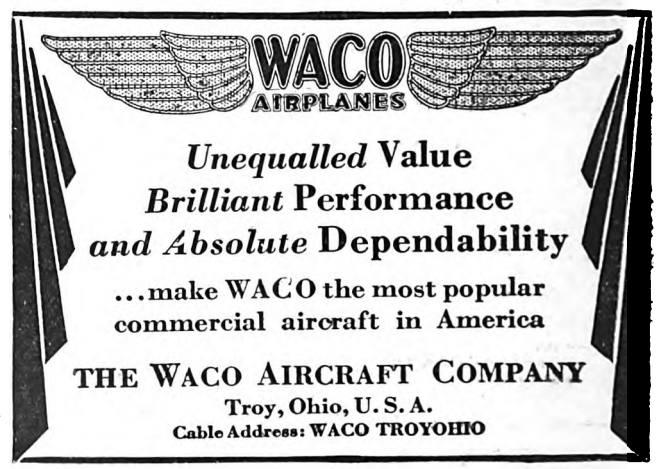
### Marriage.

HORNER—SCADDING.—On Nov. 6, at Bombay Cathedral, Flg. Off. George Kenneth Horner to Helen Aykroyd Scadding.

### Deaths.

CROSBIE.—On Dec. 2, at the R.A.F. Hospital, Uxbridge, as the result of an accident, Sq. Ldr. Ernest W. Crosbie.

MACKENZIE.—On Dec. 5, at Oakhurst, Edenbridge, Sir (James) Kenneth Douglas Mackenzie, eighth Baronet of Scatwell, Captain, late R.A.F.

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# MISCELLANEOUS ADVERTISEMENTS.

All advertisements for this column should arrive at this office by first post Monday, to ensure insertion.
For the convenience of Advertisers replies can be received at the office of THE AEROPLANE, Cannon House, Pilgrim Street, London, E.C.4.
Special PREPAID Rate—18 words 4/6, 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-, 2d. per word after. Situations Wanted ONLY—18 words 1/-. Box No. 6d. extra.

### AIR TAXIS.

**Air Taxis Ltd.**, Stag Lane Aerodrome. Edgware. 'Phone: Edgware 0849.
**Aerofilms Limited**, Aerial Tours, Taxi Work, Aerial Photography. Air Survey. Colindale Avenue, Hendon, N.W.9. 'Phone: Colindale 6183 and 6184.

### AIR SURVEY.

**Air Survey Co. Ltd.**, 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.
**The Aircraft Operating Co. Ltd.**, 8, New Square, Lincoln's Inn, London (Holborn 8131), and Broken Hill, Northern Rhodesia; Rio de Janeiro, South America; Contractors to the Ordnance Survey, Drawing Offices and Laboratories, Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

### AIRCRAFT FOR SALE.
### BRIAN LEWIS AND C. D. BARNARD LTD.
### For
### DE HAVILLAND MOTHS.

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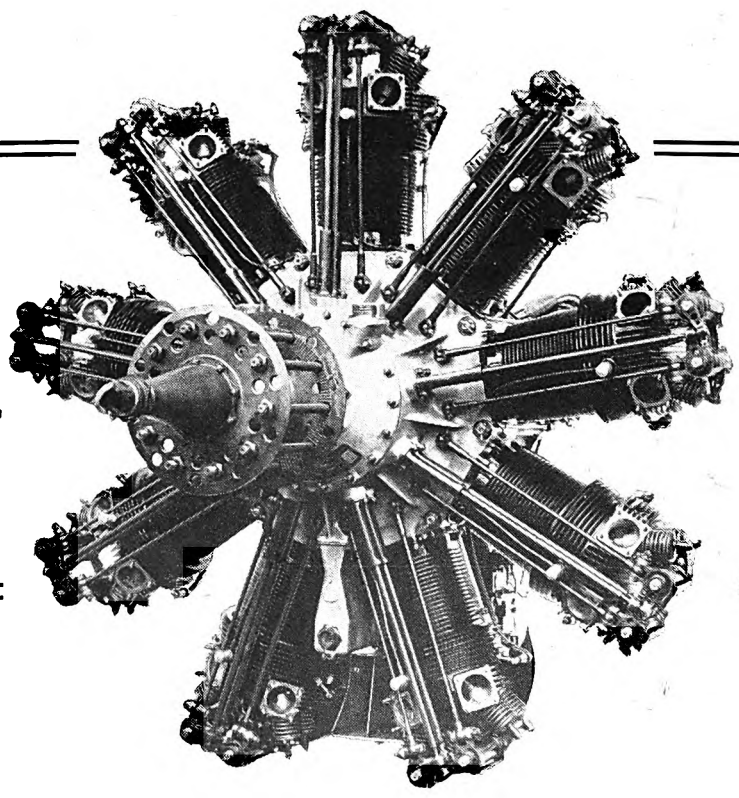

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# THE AEROPLANE

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Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by
C.G.Grey

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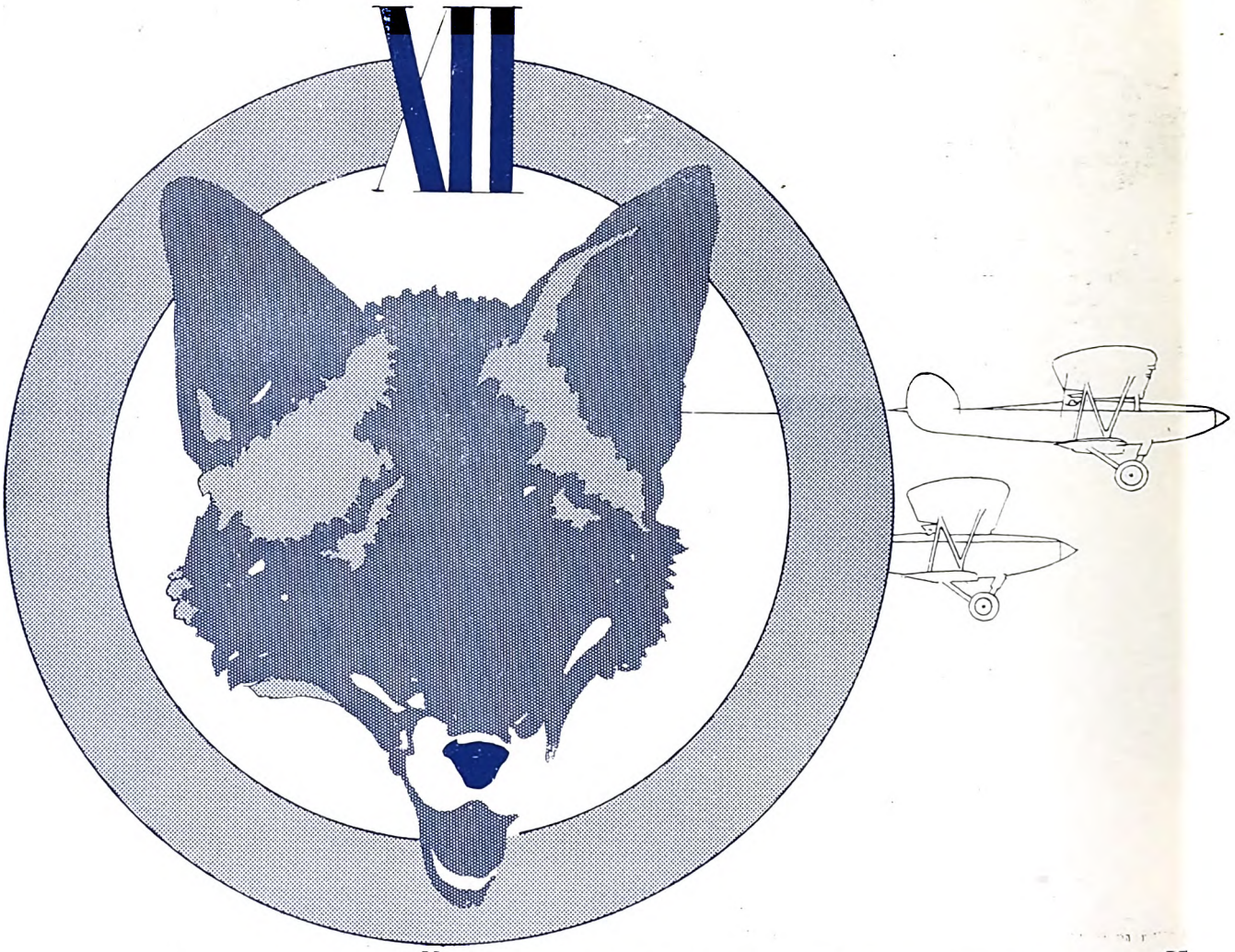


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Incorporating Aeronautical Engineering

VOL. XXXIX No. 26.

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## ON THE NEXT RACE FOR THE KING'S CUP.

Theoretically the meetings of the Committee of the Royal Aero Club are secret and confidential, like Cabinet meetings and meetings of the Committee of Imperial Defence, and so forth. And if the Royal Aero Club were merely a Club the affairs of its Committee would be of no interest to the readers of this paper. But so far as the Aeronautical Community is concerned the Royal Aero Club is in fact very much in the same position as is the Cabinet to the Public at large. And just as rumours from Cabinet meetings leak out into the daily papers so rumours from the Holy of Holies of the Royal Aero Club leak out to the Staff of THE AEROPLANE.

### OUR MOST VALUABLE RACE.

The most important sporting event of the year among the aeronautical people of this country is the Race for the King's Cup. I say this deliberately, without excepting even the Contest for the Schneider Trophy, because first of all any Cup presented by His Majesty the King is in itself a much more important thing than any international trophy, and secondly because the Race for the King's Cup covers the whole of England, as well as sometimes parts of the Celtic Fringe, and so enables several millions of people to see the Race in progress who could not possibly see a Schneider Contest.

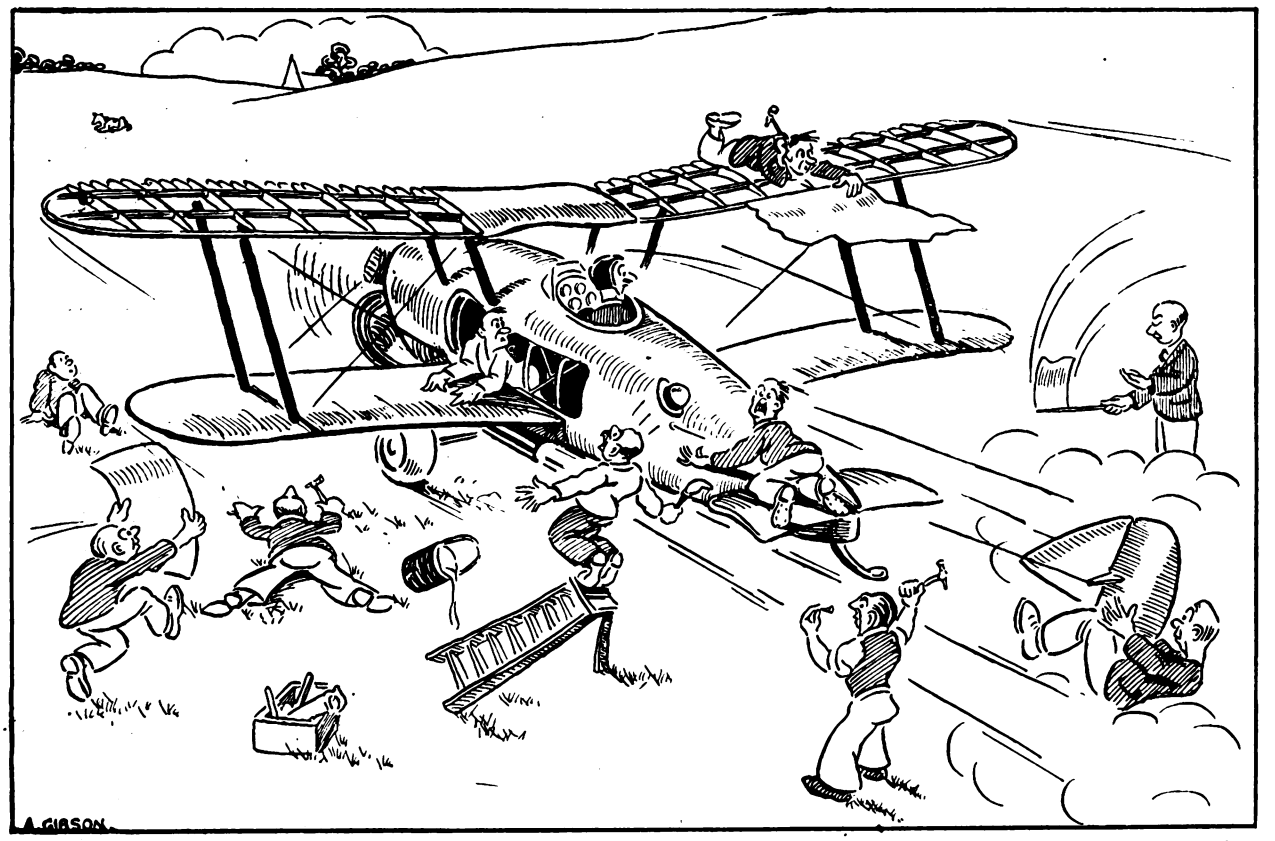
Furthermore, a very large number of people can take an active part in the King's Cup Race, whereas very few can do anything about the Schneider Trophy Contest, except put their hands in their pockets for the organisation fund (which remarkably few do) and look on while it is happening (which not very many do, considering the fuss the papers make). And even looking on at the Schneider Trophy Contest is nothing like so exciting, after a machine has once been seen doing 300 m.p.h., as is watching numbers of machines come into a control in the King's Cup Race and start again. So the King's Cup Race does more than does any other to promote airmindedness in our own folk.

Therefore, taking it all round, the King's Cup Race is actually more important than is the Schneider Contest, except purely and simply for propaganda in foreign countries. And even then the British Aircraft Industry gets more advertisement, and heaps more respect and fear, in foreign countries out of building, as it is building to-day, four different types of aeroplane which are by far the fastest fighting machines in the World, than it does out of winning any number of Schneider Trophies. And the King's Cup Race for civil aeroplanes won at a very high speed, with a number of other machines putting up a very fine performance, is also actually a most valuable advertisement for the British Aircraft Industry all over the World.

### ANOTHER AERO CLUB BLUNDER.

If the readers of this paper will accept that much as a basis for argument, they will see without much trouble that the Committee of the Royal Aero Club looks like making

"I THOUGHT I'D GO, I THOUGHT I'D NOT,
"AND THEN I THOUGHT I'D THINK ABOUT IT."
(F. LOCKER LAMPSON—*Invitation to Rome.*)




**THE MACHINE THAT WAS NEARLY READY.—A hint to would-be competitors in the King's Cup Race of 1931.—The sketch is so nearly true to life, of any air race of the past twenty years, that it is scarcely a caricature.**

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another of those colossal blunders such as it has so often made in the past. From several different directions I have been told that the Royal Aero Club proposes next year to make the King's Cup Race a competition for Pure Amateurs, and that it intends to allow any aeroplane which has a speed of over 100 miles an hour to compete.

Now, if anybody wanted to produce a race which would be thoroughly uninteresting and without the slightest benefit to anybody in the World except the competitors, that would be the way to do it. Considering that anybody with a little ingenuity could fake a Mark I Cirrus Moth to do 100 miles an hour we are likely to see the sky cluttered up with flocks of obsolete aeroplanes whose sporting owners think that they would like to flop round England in public.

On the other hand, cutting out the Trade and professional pilots means quite definitely killing any real encouragement to progress unless some very well-to-do young men, or women, have racing machines specially built for them, or unless somebody in the Trade works a wangle on the rules for the sake of the advertisement which is always to be got out of winning the King's Cup.

### FLOUTING THE GIVER.

Actually, confining the race to amateurs and letting in slow machines is little less than an insult to His Majesty the King. He gave the Cup to the Club with a definite expression of his wish that the race should be organised in such a way as to encourage the progress of British Aviation. And now the Aero Club Committee goes and alters the old rules, which were bad enough in many ways but good enough in others, so that instead of encouraging progress the race is actually an incitement to stagnation.

As a matter of fact, the rules for the King's Cup Race ought to be so devised each year as to wash out from the competition any machine which is not definitely an improvement on the average performance of the previous year. For example, a large number of the competitors last year covered the course at speeds which were considerably better than 120 miles an hour. Everybody who does any serious flying admits that an aeroplane which cannot cruise at 120 miles an hour is very little use except as a fine weather toy. And so no aeroplane ought to be allowed to start in the race this year unless it has proved that it can cover the course at 120 miles an hour, or is entered with a deposit which is to be forfeited if it does less than 120 miles an hour, barring accidents.

### CONCERNING THE TRADE.

The idea that letting Trade pilots into the race is unfair to the amateur pilot is sheer nonsense. Under the proposed regulations there is nothing to prevent a wealthy amateur from having a freak machine built for him. And that is just as unfair to the poor little wobbling amateur as if he had to compete against the whole Trade.

And if a few wealthy people do have freak machines built for them they will spoil the interest in the race still more, because millionaire amateurs are much scarcer than keen Trade competitors, and so there are bound to be fewer of the specially-faked speed machines which are in fact the entries which give the race the whole of its interest.

In view of the fact that aeroplanes built by the De Havilland Company have in the past provided not only the largest number of entries of any one make, but also the most elaborately faked and fastest machines in the race, I suppose I can say without offence that nobody wants to watch a race consisting almost entirely of what a correspondent a week or so ago called "common Moths." The use of the word "common" in this instance is in fact a compliment to the all-pervading Moth. But Brooklands would hardly draw the enormous crowds it does if the entries in its races consisted mainly of standard Morris cars, or even of Morris cars faked for speed.

The majority of readers of this paper will probably agree that the only way to make the King's Cup Race worth while is to make it a full-out competition; what boxers call, I believe, a needle fight, or something like the all-in wrestling competitions of which we have read so much in the papers, which allow scratching, biting, gouging, kicking, butting, and everything else. It ought to be a real tearing-up competition with everything allowed except sabotage. Then we should have a chance of finding out what is really the fastest aeroplane available, which after all is the main idea of organising the King's Cup Race to encourage progress.

### SOME WORKABLE SUGGESTIONS.

Perhaps something ought to be done to prevent the entry of high-speed war machines disguised as civil machines. But even then there is no getting away from the fact that considerable interest would be added to the race if we were to find on the scratch mark civilised versions of the Fairey Firefly and the Hawker Hornet (or Fury or Norn). Then we might see for ourselves which really is the faster.

Possibly something might be done in the way of dividing the competitors into classes in which each class was limited by engine capacity, that is to say, by the volume swept by the pistons. Then we should discover who could get the most value out of their engines and who could build the best aeroplane round each engine.

There might be a separate prize for each class. The classes might be handicapped one against the other without any handicapping inside each class, and the King's Cup itself could then go to the first past the post at the finish,—which is the only way to make a race interesting.

Or, as an alternative, instead of going to all the trouble of handicapping according to the existing formula, the Aero Club might adopt the plan which was so successful in one of the American competitions last year. In this the machines were handicapped according to the speeds claimed in the makers' catalogues. This form of handicapping may have distinctly humorous effects, but it would probably not provide such a good race as handicapping on cylinder capacity.

### WHAT IS AN AMATEUR?

The other vital question which arises is,—How does the Royal Aero Club propose to draw the dividing line between an amateur and a professional? So far as I can learn, the proposition is that no professional pilot is to be allowed to compete, and that nobody who is connected with the Trade is to be allowed to compete.

That puts out of the race everybody who holds a "B" licence. It puts out all the test pilots of all the different trade firms. It puts out all the demonstration pilots and flying salesmen and all the directors of trade firms who are also pilots, whether they hold "A" or "B" licences.

And if the idea is carried to its logical conclusion, it must of necessity also put out all R.A.F. pilots, because if an officer in the R.A.F. is not a professional pilot, then what in Heaven is he?

The Aero Club Committee cannot plead that because an officer in the R.A.F. is an officer he is a gentleman amateur and that because an ex-R.A.F. officer who is still an officer of the Reserve is a test pilot for an aircraft firm he is no longer a gentleman. And anyhow all pilots who have raced for money prizes have lost their amateur status.

Therefore, having eliminated all the "B" licence pilots and all the R.A.F. pilots you reduce the race to a tour round England by "A" licence pilots,—which is absolutely, completely and utterly fatuous.

Then you bump into all kinds of subsidiary questions. Take, for example, Mr. Alan Butler, the Chairman of the De Havilland Company. He is obviously barred, as a member of the Trade. Mrs. Butler beat Mr. Butler's time in the King's Cup Race last year, and therefore may be regarded as being just about as competent a racing pilot as he is. But is the Committee going to bar Mrs. Butler because her husband is in the Trade?

As a matter of hard fact, Mr. and Mrs. Butler are both amateur aviators,—in that they do not depend on the Trade for their livings. If the whole Aircraft Trade blew up in flames and aviation ceased to exist they would be very little poorer because of the explosion. But if the converse happened, the Trade and British Aviation would be very much poorer without them.

Mr. Butler came into aviation because he was in love with aviation, which, after all, is the meaning of the word amateur. If he is barred and Mrs. Butler buys an aeroplane with her own money there is nothing to prevent her from sending that machine into the De Havilland Works and having it made into a freak like the machines which Mr. Butler and Mr. Broad flew last year.

Lieut.-Colonel Louis Strange, of the Spartan company, is another instance. Having ceased to be a blood-stained war pilot in 1918 he became a peaceful farmer for some years, and then, because he loved aviation, he became an amateur aviator and a member of the apparently despised Trade.

Another is Mr. Nigel Norman. As an officer of 601 (B) Squadron, A.A.F., he is presumably an officer and gentleman. As a proprietor of the Heston Air Park he is presumably outside the pale of decency,—according to the Royal Aero Club.

Take another point for argument.—Suppose the Aero Club Committee in its wisdom decides that serving officers of the R.A.F. shall be regarded as amateurs, even though officers of the Reserve of Air Force Officers and officers of the Auxiliary Air Force are not, and one of the R.A.F. pilots attached to the Royal Aircraft Establishment is chosen to fly a machine which has been prepared for the race by the R.A.E. Aero Club. Then you will have a machine faked up for the race by professional aeronautical engineers backed by all the experts provided for them at the rate of £400,000 a year, which is spent on the R.A.E. by the British Taxpayer.

Is that fair competition for the poor little wobbling amateur for whose private sport the Committee of the Royal Aero Club seems to be so solicitous for the first time in its life? And can we believe that the Royal Aero Club at this time of life is going to turn so pure and respectable?

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THE REDUCTION TO ABSURDITY.

No doubt readers of THE AEROPLANE will be able to think out for themselves a whole lot more points on which this idea of making the King's Cup Race a contest for pure-bred amateurs will appear equally ridiculous. But the idea can never possibly be made to look so ridiculous as the Racing Committee and the General Committee of the Royal Aero Club will look if this futile idea is ever put into action. There is a gentle jest about a person who said to another,—"Are you trying to make a fool of me, Sir?"—To which the other answered,—"No! I always believe in letting Nature take its course." We may fairly safely let Nature take its course with the Royal Aero Club.

Amateur sport is an excellent thing in its way, and the amateur who is an amateur in the etymological sense of the word is once in a while superior to the most expert professional, in any branch of sport. But aeroplane racing is not yet a game in which the pure amateur can be segregated from the impure amateur or the semi-professional from the pure professional.

At the present moment the various Aero Clubs can provide perfectly well for the pure amateur pilot in their own little competitions. Or, if the Royal Aero Club likes, it can draw up a hard and fast specification for a pure amateur, and can present a prize for the first pure amateur under that specification to finish in the King's Cup Race. I suggest that the handsome Trophy presented some years ago by the Society of British Aircraft Constructors and allotted from time to time under all sorts of varying and quaint rules at different Club meetings might be definitely allocated for that purpose.

Nothing could be more fitting than that our bright particular star of amateurism, when we discover him, should be presented with a prize, and an accompanying Certificate of purity, by the Aircraft Trade.

But so far as the King's Cup Race itself is concerned, let us have an all-in race, so far as may be possible without any rules or regulations, in which the Cup which has been so graciously presented by His Majesty the King for the improvement of the breed of British aircraft shall be won by the best aeroplane, the best engine and the best pilot in combination.—C. G. G.

## MISS SPOONER'S ADVENTURE.

So many wholly erroneous and utterly absurd stories have been published about the descent of Miss Spooner and Mr. Edwards into the Tyrrhenian Sea that a few authentic facts will no doubt be welcomed by the readers of THE AEROPLANE. In the first place the machine was not brought down by engine failure because the engine was running quite happily when it hit the water. Why it hit the water is not yet explained.

Shortly before the machine hit, Miss Spooner, who had been asleep, woke up and saw the lights along the shore, presumably those of Belmonte. She was looking for some maps in the locker when the machine actually hit the water. Therefore obviously there was nothing the matter with the engine and the machine was not in a spin or out of control. It cannot have been in one of those curious spins in which the centrifugal force acts in such a way that the pilot thinks he is flying straight, because in either event Miss Spooner or Mr. Edwards would have seen the shore lights whirling round them.

Purely as a conjecture one suggests that possibly the lighting of the interior lamp while Miss Spooner was looking for the maps may have caused reflections on the glass in front of Mr. Edwards in such a way that he lost whatever horizon he was using as his indicator, and may even have been deceived by a reflection, and refraction, from the shore lights through the side windows onto the front glass into thinking that his horizon was elsewhere and so may have put the nose of his machine down so that it flew into the water. Probably there are fifty other explanations as good, but that is offered for what it is worth. Sloping front screens in cars produce queer effects, and so they do in aeroplanes.

When the air-screw hit the water the torque-reaction evidently pulled the whole engine sideways, as is shown by the fact that the engine-bearers are broken away on one side and only bent on the other. The undercarriage was evidently torn back and tore the floor with it.

Miss Spooner is under the impression that Mr. Edwards pushed her out through where the floor of the machine had been before getting out himself. When she came to the surface she began to swim to the shore and then shouted for Mr. Edwards. Hearing him shouting she concluded that he was all right and went on swimming for the shore.

Apparently Mr. Edwards did not hear her shout because he was shouting so loudly himself. He must have come up almost simultaneously with the aeroplane, which fortunately for him, thanks to its wooden wings and extra large petrol tanks, would have floated indefinitely so long as the sea was moderately calm. Fortunately the sea was quite calm.

After swimming for something between one and two hours Miss Spooner reached the shore and staggered to a house where she woke the people who woke others and ultimately two out of the three fishing boats belonging to the place went out to look for Mr. Edwards. One returned without him and Miss Spooner induced that boat to take her out to look for him. On the way they met the other boat with Mr. Edwards in it towing the aeroplane.

In a letter home Miss Spooner remarks that as she was swimming to shore she wondered why instead of swimming so far to the shore she had not swum back to the machine. Then she realised that when she came to the surface and began to swim there was no machine to swim to, because she came up so much faster than the machine did.

Actually, the fact that she did swim to the shore was probably the saving of both of them, because if they had both sat on the machine they might have become exhausted and have fallen off and been drowned. Or the machine might have been drifted out to sea and never have been found.

In any case Miss Spooner is to be congratulated on a very fine swim and on giving another exhibition of her extraordinary pluck and endurance. Everybody will hope that she may manage to get her machine re-conditioned and may yet succeed in her attempt to get to Cape Town and back in record time. The scheme is hazardous but it does definitely point the way towards progress in air transport.—C. G. G.

## THE MONO-SPAR FLYING.

Those who appreciated at the time of the Aero Show at Olympia last year the possibilities of the mono-spar wing will be interested to hear that an aeroplane built on this principle has recently been flying, first of all at the Gloster Aircraft Co.'s aerodrome at Brockworth, Gloucester, where it was built, and more recently at the N.F.S. aerodrome at Hanworth.

The mono-spar principle is extremely interesting because it appears to fulfil two distinct objects.

First, it allows lightening of the wing by allowing the use of less material for the same strength, by the simple process of abolishing material which does little or no work. Obviously the weight thus saved becomes available either for increased pay-load in a commercial machine, or increased petrol load in a long-range machine, or increased speed and climb in a fighting machine.

Secondly, what is possibly even more important, the mono-spar principle allows the production of a cantilever wing of proper plan form and of proper section from butt to tip. The ordinary wing built up with two parallel spars cannot carry a selected wing-section right out to the tip, because it has to make room for the rear spar. And even if the rear spar be brought forward to join the front spar at the tip it still seems to prevent the production of a desirable wing section. Thus the mono-spar principle would seem to give promise of great improvement in span-loading as differentiated from mere surface loading.

The Mono-spar Monoplane is a very fascinating little three-seat low-wing monoplane with two 40 h.p. Salmson engines. That is to say the total engine-power of the machine is about that of a Mark I Cirrus Moth. The engines are not yet properly tuned and the air-screws are experimental, but with two up the speed of the machine is well over 100 m.p.h. Also experimentally, with the pilot only, it has been taken up to 16,000 feet in remarkably good time.

Thanks to its wheel brakes and completely orientable tail-skid, its manœuvrability on the ground would turn a Yellow Taxi green with envy. And with two up its get-off resembles that of a flea rather than that of any flying insect. Apart from that, its aspect on the ground is very much more that of an insect than that of a bird.

The machine was designed originally for two 80 h.p. Redrup engines, but because of those unforeseeable snags on which new engines always strike, the little monoplane after several months of waiting has had to be fitted with two 40 h.p. Salmsons. It is therefore 80 h.p. under its designed power, but personally one feels that the replacement of engines is no misfortune because the Mono-spar principle and Mr. Stieger's aeroplane design can now be tried out not only with a power plant about which everything is known, but, thanks to the power being reduced to its present amount, the efficiency of the aeroplane can be compared with that of other aeroplanes of precisely similar power, albeit with the power concentrated in a single engine,—which is actually lighter.

So much can have been learned by any habitué of Hanworth, but further and even more interesting facts cannot be divulged because the Aero Syndicate Ltd., of Byron House, St. James' Street, S.W.1, who have produced the machine, do not wish to say too much about it until more of the type

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modified as may be indicated by experience with this machine, are ready for production.

This is undoubtedly a sensible policy because many a good article has had its market spoiled by having too much shouting done about it before it was properly developed. People have been induced to order things and then have been disappointed over deliveries and have gone and bought similar things elsewhere, or else some unexpected snag has been found with the first deliveries and the makers have had to replace defective parts at great expense,—this is a thing which has happened often in the Motor Trade for example. Therefore the Aero Syndicate are determined not to do anything about selling Mono-spar machines till they are perfectly sure that they have discovered all the snags and can deliver in reasonable time at a reasonable price.

Nevertheless, this little experimental machine does give such an extraordinarily good impression at first appearance that we should be failing in our duties as a newspaper if we did not publish so much about it as may be gathered by any onlooker at the aerodrome. Moreover we feel that readers of THE AEROPLANE Overseas who are really interested in progressive ideas will be glad to give this much information, so that they may get in touch with the Aero Syndicate with a view to future developments, and distinctly on the understanding that the machine is not yet on sale.

The delay in producing this first machine is rather a pity because the Mono-spar patents, which were taken out by Mr. H. J. Stieger, Sq. Ldr. R. A. de Haga Haig, and Mr. A. E. L. Chorlton, have been in existence for some time and if they had been developed as quickly as they might have been from the start we might have been a good deal further ahead in certain lines of progress. Although the idea of designing a completely new type of aeroplane based on these patents is very progressive, and is commercially a very brave thing to do, a more convincing argument might have been the buying of an ordinary Fokker monoplane, whose performnace was exactly known, and the fitting of it with a mono-spar wing to show exactly the amount of weight which could have been saved by this principle and the improvement in performance which could be achieved with it.

The combination of two or more purely experimental principles is always a risk, because if the combination succeeds there is no definite proof which factor is responsible for the improvement and if it fails the wrong factor may be blamed for the failure, whereas if only one factor in an existing combination is changed then the proof is definite, for the performance can only be improved or deteriorated by that factor.

We learn that a mono-spar wing is in fact approaching completion, and is being built to the order of the Air Ministry for the Fokker monoplane with three Lynx engines which was bought by the Air Ministry from the Fokker Company for experimental work some years ago. The performance of that monoplane is known exactly and the effect of the mono-spar wing will therefore be fairly well proven. But here again an unnecessary amount of experimental work is involved. The wing has had to be designed to carry the two wing engines, and the position of those two engines in relation to the leading edge may conceivably affect the wing unfavourably,—and on the other hand conceivably it may affect the wing unduly favourably. But if a wing had been built for a standard single-engined Fokker it could have been in use over a year ago.

However, all things work together for good, and there is no doubt that the existing Mono-spar Monoplane is an extraordinarily interesting production and may quite conceivably mark a considerable step forward in the progress of aeroplane design and construction.—C. G. G.

## A BRIEF INTERLUDE.

As reported in THE AEROPLANE, Major Juan Franco took his departure on Nov. 24 from prison where the Spanish authorities had confined him on grounds of rebellious and republican behaviour. He flew the South Atlantic in 1926, and since then he has enjoyed some North Atlantic notoriety—it could hardly be called trans-Atlantic—when the British aircraft carrier, H.M.S. *Eagle*, fished him out of its waters, with his seaplane and crew, off the Azores last Summer. He lent drama to his escape from prison by filing a bar from the chapel window, instead of breaking his parole by the more simple and direct route through the front door.

Reports now say that on Dec. 15 he appeared at Cuatro Vientos Aerodrome, the chief military aerodrome of Madrid, and the most important centre of military aviation in Spain, and took command. Wireless appeals were sent out to other aerodromes to join the Republican Revolt.

The report goes on to say that at about 09.00 hours two military aeroplanes, their national colours covered by red discs (why not merely painted over?), flew over Madrid dropping leaflets which read as follows:—

Last night the Republican movement so long awaited and desired by all lovers of justice broke out all over Spain, effected by the people and the Army combined. Reports received by the provisional Government everywhere confirm its anticipated success. You must all join the movement and so avoid civil war, and show the world that the Spanish nation is capable of controlling its destinies in conformity with modern ideas of justice, peace, and work, thus preventing passions from making innocent victims. Join us and deserve well of the country and the Republic. Should you be weak enough to oppose the national will you will be the first victims. Unless you submit, your barracks will be bombed within half an hour. Soldiers, viva España! Viva la Republica!

In very short order a column of Government troops under General Orgaz advanced on the aerodrome, surrounded it with infantry and artillery, and after a short bombardment observed white flags and other evidences of contrition. No casualties are reported, but numerous prisoners were taken by the Royal forces.

Meanwhile Major Franco and several other officers left the field in four aeroplanes and flew over the border to Amadora and Alverca, in Portugal. Government aeroplanes which chased them failed to bring them down or do any damage. The refugees were interned by the Portuguese authorities and sent to Masra.

Major Reyes, who escaped with Franco from prison, and Rada, his mechanic, were with him at Cuatro Vientos, but there is no news of their present situation.

Towards evening an aeroplane of the *Aeronautica Militar* dropped leaflets over Madrid to the following effect:—

Low-born scoundrels, apparently eager for your blood, stole a military aeroplane in order to distribute pamphlets exciting you to rebel, thus deceiving you basely. Your honour and commonsense will convince you of the vileness of such action, conducing to civil war. You should hound them down like mad dogs. Soldiers and workers, watch over the peace of your country and your families, and remain loyal! Long live Spain! Long live the King! Long live social peace!

Excitement does not seem to have risen high in Madrid. Police detachments are patrolling the city, guarding the palace and—rumour says—the Athenæum Club. A report that the rebels conscripted the Bishop of Jaca for use as a stalking horse suggests that the Government is cleverly cutting off the supply of prelates at its source.

Other uprisings, without benefit of aviation, occurred at San Sebastian, Santander and Seville. The rigid censorship, and strict precautionary measures on the Franco-Spanish frontier have prevented the full details from becoming known to the outside world. The whole thing reads like comic opera, but the Carlist Wars and other internal troubles in the past suggest that this may be no laughing matter. The sympathies of all English people of the right sort will be with that good sportsman King Alfonso. He may at times have been misled by his ministers, but there is no getting away from the fact that during his reign Spain has enjoyed such prosperity as it has never known.

## A TRANSATLANTIC AIR SERVICE.

In the House of Commons on Dec. 10, in reply to a question by Rear-Admiral Sueter, the Under-Secretary of State for Air said that negotiations for establishing an air service between Baltimore and Bermuda, with a view to the eventual extension of the service across the Atlantic by way of the Azores to this country, had been in progress for some time. The project was not exclusively American and involved co-operation between British and American air interests.

## THE WEST INDIES AIR SERVICE.

In the House of Commons on Dec. 10, in reply to Rear-Admiral Sueter, the Under-Secretary of State for the Colonies said that proposals for the establishment of air services in the British West Indies had been put forward by Atlantic Airways Ltd. He understood that the initial operation contemplated by the company was the establishment of a service connecting Trinidad with British Guiana, Barbados and Venezuela. Full particulars of this initial scheme had been communicated by the Secretary of State for the Colonies to the officers administering the Governments of the Colonies in question, and he hoped shortly to receive their observations on the company's proposals.

Replying to Capt. MacDonald, Dr. Shiels said that he understood that Atlantic Airways Ltd. was entirely a British company.

## THE MEOPHAM ACCIDENT.

In the House of Commons on Dec. 10, in reply to a question by Capt. Balfour, the Under-Secretary of State for Air said that, as stated in the interim report on the accident already published, extensive tests on a model of this aircraft had proved necessary to elucidate some of the technical problems involved. The results of these tests had only just become available and the sub-committee of the Aeronautical Research Committee were considering them. He hoped that a final report from the Committee would be available about the middle of January at the latest. The Secretary of State for Air would prefer not to make a decision as to the holding of a public inquiry until after he had received the report of the Aeronautical Research Committee but if it then appeared that any useful purpose could be served by such an inquiry it would be held.

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# *Further proof of Napier Reliability!*

The following are extracts from a letter received from North Sea Aerial and General Transport Ltd., of Brough, England, dated Dec. 1, 1930

"ON our Blackburn Napier Darts with which this flying school is equipped for advanced training, we have flown this year approximately 2000 hours.

"THIS has been accomplished with five of your engines each of which has run 400 hours without overhaul, during this period these engines have been to all intents and purposes trouble free, major replacements being nil: in other words our machines have flown 180,000 miles without a forced landing.

"WE have been using your engines since early 1923 and three of the engines actually purchased at that time are still in service, and we anticipate that they will continue to give us service for some years to come.

"AT a rough estimate your engines at this School HAVE COMPLETED OVER HALF A MILLION MILES IN THE AIR."

# NAPIER

D. NAPIER & SON, LTD.
ACTON, LONDON, W.3.




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## SOUTH AFRICAN CIVIL AVIATION.

Union Airways, Ltd. completed its first year of service at the end of August last. During the period July—Sept., 1930, the mileage flown was 40,864, and 76 passengers and 2,395 lbs. of mail were carried. During its existence the company has had no accident to personnel or passengers and only on two occasions have trips not been completed according to schedule. Both these delays were caused by abnormally bad weather.

The South-West African Administration has accepted the tender of the local Junkers representative for a mail, passenger and freight service between Windhoek and Kimberley, a distance of about 850 miles. This service will begin operations on April 1, 1931, and it is intended that it will act as a feeder line to the London—Cape Town air route when this latter service opens up on its southern section. The contract is for five years and the Administration has agreed to pay an annual subsidy of £7,000.

The machines to be used on this service will be Junkers Junior monoplanes (80/88 h.p. Armstrong Siddeley Genet engines) so that it is obvious that the operating company does not expect a very great influx of passengers and freight. It is expected that about 13-14 days will be saved on the European mails from Windhoek when the Imperial Airways Cape Town—London route is in full operation.

On Sept. 1, 1930, there were 63 private pilots, 23 commercial pilots and 29 certified ground engineers in the Union of South Africa.

Similarly there were 39 registered civil aircraft and 29 licensed aerodromes in the Union.

Mr. J. G. Francis has been appointed Director of Civil Aviation in the Union of South Africa with effect from August 1, 1930.

## JUNKERS IN SOUTH-WEST AFRICA.

Evidently, judging by recent issues of South African newspapers, the recent agreement between the Administration of South-West Africa and the Junkers Company regarding the operation of an air-mail service from Windhoek to Kimberley has created a considerable journalistic storm in the English section of the press.

The Administrator of South-West Africa, Mr. Werth, has issued a counterblast in the shape of a detailed statement, in which he emphasises the fact that the tender submitted by the Junkers Company was in every respect more favourable than that of the rival native organisation, namely Union Airways, although the actual amount of Government subsidy demanded was, in each case, much the same.

The Junkers Company asked for £7,000 per annum, whereas Union Airways demanded an initial subsidy of £7,500, to be reduced after two years to £7,000 and later to £6,500. The Junkers Company, however, offered considerably cheaper rates for the actual carriage of mails,—about 25% lower than those demanded by Union Airways.

In addition, the Junkers Company agreed to grant a rebate of 50% in the event of the weight of mail carried exceeding a certain stipulated figure, provided that the total rebate in any one year did not exceed the amount of the annual subsidy. In other words, provided that the air-mail developed in a satisfactory manner, the subsidy would be completely refunded. As Union Airways offered no such inducement, their tender was not accepted.

The Junkers Company, therefore, held out definite prospects to the Administration that the latter's financial responsibility would, in time, be lessened, whereas the proposal submitted by Union Airways did not do so in anything like the same degree. Furthermore, the Junkers Company undertook to employ only South African pilots, thereby providing a new means of employment to the young men of South-West Africa and the Union of South Africa.

The rates demanded by both firms for special flights on Government service were about the same, except that Union Airways stipulated that there should be no statutory penalties for overdue arrivals, while the Junkers Company agreed to pay a conventional fine of £3 10s. per hour of late arrival, provided that the maximum penalty was fixed at £20.

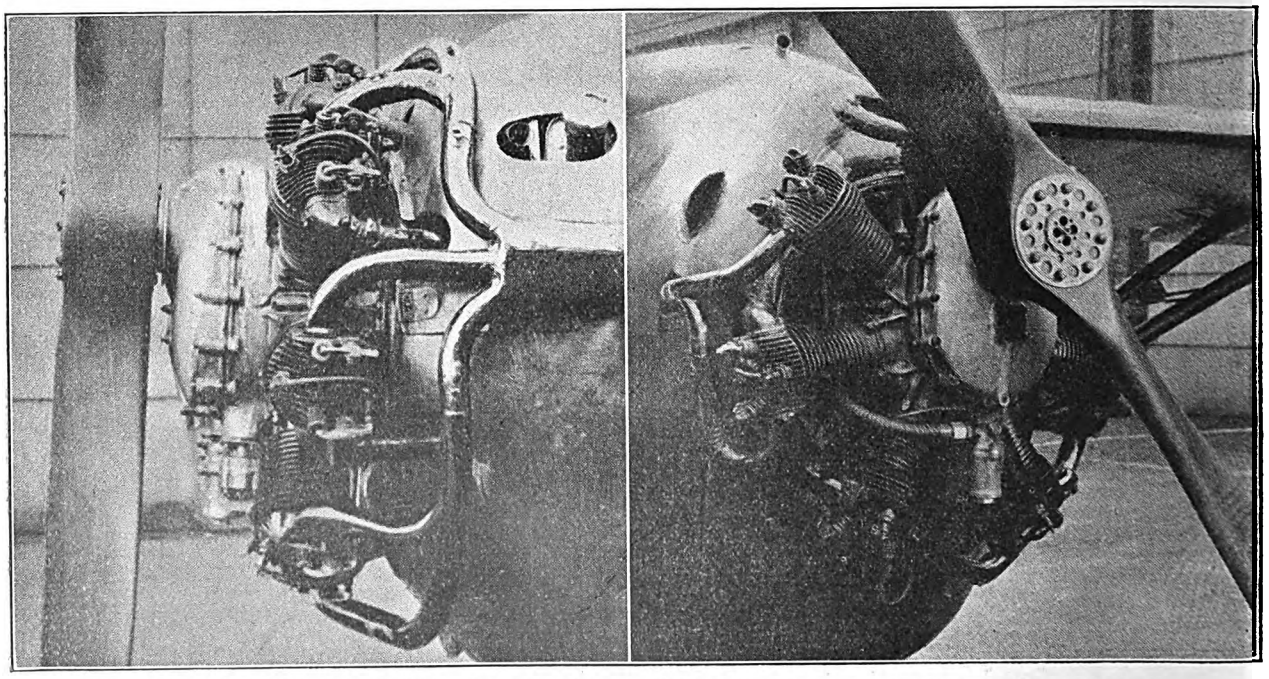
Mr. Werth points out that, in the event of war or civil commotion the personnel, machines and equipment of the air-mail service would at once be placed at the disposal of the Administration. Here again the offer of the Junkers Company was more favourable than that of Union Airways.

Owing to the great distances in South-West Africa it is absolutely essential that the Administration should have some aeroplanes at their disposal. Various difficulties which have arisen in the Kaokofeld, in Ovamboland and also in the Caprivi Zipfel have necessitated long and costly journeys by Government officials in motor-cars. These journeys often take weeks, but many of them could be accomplished in one day if aeroplanes were available. Consequently the air-mail service will prove a great saving to the Administration as, apart from its normal function, it automatically provides a mobile police force which can be used in the event of trouble with native tribes in remote districts.

The Administrator concludes his statement by expressing his regret at the attempt by the press to sow the seeds of racial discord among the population of South-West Africa, and emphasises the fact that the Junkers tender was unanimously accepted by the Advisory Committee which was constituted by himself (the Administrator), two German, three British, and two African members. In the opinion of the Committee, the Junkers tender was the better commercial proposition and the members felt themselves bound to accept it. The competition for the contract could only have a salutary effect, and South-West Africa is not afraid of competition.—H. N. E.

## READY FOR SERVICE.

The Guild of Air Pilots and Air Navigators of the British Empire applied some time ago for a pilot, and many of the applicants for the position learned for the first time that such an information and employment exchange existed for the benefit of qualified aviators. Since that time the Guild has had several more enquiries, and has on its books the names of some first-class pilots. Interested persons or firms should communicate with the Secretary, Employment Bureau, G.A.P.A.N., 61, Cheapside, E.C.2.



**THE LATEST POWER PLANT.—The new 75 h.p. Pobjoy Airmotor in a Comper Swift at Hooton.**

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# THE BRITISH AIRCRAFT INDUSTRY AND THE PARIS SHOW.

Since the last issue of THE AEROPLANE appeared more information is forthcoming concerning the suggestion which was made in the first Paris Show Report to the effect that the British Aircraft Industry would have done better to have had a collective exhibit than to have allowed a few British exhibitors to be distributed in odd corners of the *Grand Palais*. What happened actually was that right at the beginning of things the Society of British Aircraft Constructors enquired from the *Chambre Syndicale*, which runs the Paris Aero Show, whether they (the S.B.A.C.) would be allowed to stage a really national combined show for the British Aircraft Industry.

The reply they got was that this would not be allowed and that individual exhibitors would have to chance their luck in the allocation of stands. Thereafter certain people in the British Aircraft Industry learned that no foreign machines would be allowed on the floor of the main hall.

Naturally, that was quite proper from the point of view of the French Aircraft Industry,—who were running the show for their own benefit and not for the benefit of foreign competitors. But if foreigners are not to have equal and fair treatment, then the *Chambre Syndicale* should cease to call it an International Exhibition and should make it exclusively French.

Apparently an exception of this rule was made in favour of the Dornier Do.S, but this seems to have been because the French wanted a successful flying-boat at the Show, seeing that their own big flying boats have been such lamentable failures, and so they accepted the Dornier entry although the machine could not, because of its size, be put anywhere other than on the floor.

Naturally, the British Aircraft Industry did not want to have a collective exhibit pushed up into the top gallery and so the proposition for a combined exhibit fell through. I am told that the British Industry was also refused permission to hire the whole of one of the side sections which are raised about five feet or so above the main floor and are under the gallery. The whole of one of these sections was occupied by an Italian exhibit, but this exhibit was not a combined exhibit of the Italian Aircraft Industry. It was a single exhibit by the Italian Government, which embraced most of the Italian Aircraft Industry. Readers will perceive that there is quite a nice distinction between the two arrangements.

Under such circumstances all the greater credit is due to the individual firms in the British Aircraft Industry who devoted money and time to exhibit what they did. At any rate foreign visitors who saw the British exhibits cannot have helped being impressed by the excellence of our workmanship and finish compared with anything that they ever see on the Continent of Europe. And we can only hope that when we do have an Aero Show of our own again, which cannot be before 1932, we shall be able to offer such attractions to all the aeronautical people who matter on the Continent that we shall create a much greater impression than if we had had a somewhat cramped collective exhibit in the *Grand Palais*.

### WHERE WE SCORE.

In the meantime, the people on the Continent who matter are begining to realise that whatever temptations may be offered by our competitors in other countries in the way of cut prices, extended credit, national loans, and, to put it brutally, plain staightforward graft, our British aircraft are a long way ahead of anything else in the World.

When our makers quote a performance our aeroplanes perform accordingly. We do not have to fit one kind of airscrew for speed and another for climb and another for take-off as do some of our competitors. They find that with standard airscrew for all-round performance they can get a better performance out of British aeroplanes than they can out of aeroplanes of any other country. And they all know that the workmanship and the material in British aeroplanes are far better than they can get elsewhere,—in spite of libellous attacks in the local papers, which are bribed by our competitors to publish lies about our products.

All foreign Governments which are likely to buy aircraft know that our fighting machines are by far the fastest in the World and that our flying-boats are far more seaworthy than those built elsewhere. Buyers of light aeroplanes for private use or for taxi work know that ours cannot be approached by those of any other country.

One of the leading aircraft constructors in this country stated definitely the other day that what with British Government orders and with foreign orders his works have enough to keep them going on full time until well on in 1932. And there are other British aircraft factories in the same happy state. People all over the World are beginning to realise the benefits of air transport as well as the vital necessity of air defence, so between the two classes of aeroplanes the prospects of the British Aircraft Industry are particularly bright.—C. G. G.

## BRITISH EXHIBITORS OF COMPONENTS.

### BOULTON AND PAUL LTD.

Boulton and Paul Ltd. are sole licencees for civil use of the Townend Ring in Great Britain, where the patent rights are vested in the Government, and also own sole rights for all foreign patents on the ring. In its latest form the device now makes its first public appearance on the Boulton and Paul stand.

The new form is polygonal, with as many sides as there are cylinders, so that the Jupiter VIII F which occupies the position of honour is cowled with a nine-sided ring. The leading edge is formed of an exhaust ring placed clear of the cylinder heads and slightly in front of them. The trailing edge is attached in panels which can all be removed and replaced by two men in less than 10 minutes. When they are unshipped the valve-gear is readily accessible and a cylinder can be removed without further dismantling the exhaust ring. No front cowling or spinners are used because these are said to be unnecessary when the Townend Ring is properly applied.

By way of proving that the ring thus used definitely de-

**SHOWING HOW.—The Bristol Bulldog (Jupiter engine) in the Grand Palais, showing what all-steel construction can be.**

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creases the drag of the engine nacelle, a model radial engine is set up before a wind-generating fan with the ring hung about it in a way that permits its movement fore and aft. When the air stream is turned on the ring floats forward instead of being blown back, showing that there is a regenerative thrust effect which increases with the speed of the air flow.

Its forward component represents the saving in drag on the engine nacelle alone. Further saving is quite likely from the reduction of turbulence about the fuselage farther back.

The one-fifth scale models from which the wind-tunnel data were compiled are exhibited, and the rest of the stand is occupied by samples of the Boulton and Paul methods of metal construction.

Light aeroplane wings are shown with the new spot-welding method of rib construction, and spars, all of strip steel. We were told that these frames are as light as wood, stronger, and would be equally cheap in large quantities. Naturally the repairability is somewhat less; or at least we understand that the insurance assessors think so.

Large boards show a great variety of fittings and sections of both steel and duralumin construction.

### VICKERS (AVIATION) LTD.

This exhibit contained no full-sized machines, but models of the Vickers Intercepter low-wing monoplane with the Mercury engine, the Vellore, Sea Hawk, Vespa, Viastra, Vildebeeste, the Supermarine S.6 and the six-engined flying-boat now under construction were displayed. Underneath them were coloured transparencies of the machines flying.

The most interesting item was the frame of accessories for which Vickers (Aviation) Ltd. have a very wide market indeed. The beauty of their special anodic finish for duralumin parts is striking. The range of streamline bracing rods is impressive and varies from very slender sizes to the great rods which were made by Vickers for the Do.X.

### IMPERIAL AIRWAYS LTD.

Britain's air line was represented by models of the familiar Argosy and the new Handley Page 42. Other cases showed larger models of the cabin interiors of each.

### LODGE PLUGS.

Amid the large array of engine accessories such as magnetos and sparking plugs the stand of Lodge Plugs Ltd. stood out with the satisfactorily British Supermarine S6 surmounting it in effigy and an interesting exhibit of the plugs themselves below. Their slogan, "The Fastest Plug in the World," was refreshingly boastful on a British display.

### CHANCE LIGHTS.

Not least important for night or winter flying is ground equipment and lighting. The ancient English firm of Chance Brothers let their light shine from a stand in the balcony, and their "4th order beacon" shed a powerful ray on many things that twilight would have suited better.

They also displayed an automatic acetylene "5th order beacon," a lighted landing T, ceiling, course and boundary lights.

## ACCESSORIES AT THE PARIS SALON.

Perhaps as interesting as the aeroplanes themselves are the various refinements which make flying more practical, safer and increasingly efficient. At the *Grand Palais* these occupied the galleries round the main hall and succeeded by various devices in attracting the public attention, even though the public at large, judging by remarks, had a very meagre understanding of their nature, use or importance.

An aeroplane occupies a large space, and those features of it which the visitor is at liberty to inspect closely—by no means all, as a rule—are soon disposed of. In the galleries the small stands frequently managed to pack a day's study in a small cubicle, even though the examination rarely brought to light a new principle or a really original application. Here, also, one may see the inwardness of many devices which are shown, indeed, on the aeroplanes but all too frequently without their insides and hurriedly attached to the unfinished machine as an earnest of the designer's good intentions.

### AIRSCREWS.

Among the facts which made themselves noticed at the *Salon* was the great preponderance of metal airscrews. They probably partook of the dress-uniform quality of many other accessories but serve to indicate a rational trend. As a matter of fact metal is used for this purpose on the Continent and in America more than it is in England, where the non-vibrating quality of wood still holds it in favour.

The most generally seen type of metal airscrew is the Levasseur, and then usually of the twisted plate type invented and patented by Mr. Reed of the U.S.A. These are bored for the propeller-shaft, but instead of the ring of bolt-holes usual on wooden airscrews there is a clamp consisting of two plates, respectively fore and aft of the one-piece blade, bolted together at the edges without further drilling of the airscrew itself. About a third of the aeroplanes on the floor have this type.

There are also Levasseur types which are cast and machined *en monobloc,* and others with separately machined blades which can be adjusted for pitch on the ground.

The next most popular is the Ratier helix,—the French word *hélice* is a good representative term for the genus tractor-airscrew-propeller. The Ratier is the most shapely type on exhibit, with its smallish boss, which is a slightly tapered transverse cylinder, and slender elliptical blades. These blades are threaded at the butts and screw into the boss where they are clamped by an external threaded collar toothed for positive locking. They are adjustable for pitch and interchangeable.

Breguet airscrews are very similar in general form and in principle except certain special types. The one used on the Breguet 27A2 *tout acier* biplane is machined out of a single bloc, becomes slender in the middle in practically circular section, and is held onto a flange on the crankshaft by four projecting lugs and bolts.

Somewhat similar to the last is the Chauvière Intégrale type, which is a monobloc and attached to a crankshaft flange by two bolts only. Bossoutrot and Rossi used this type on their recent endurance flight which was almost a record.

Gnôme-Rhône make a model with an adjustable and interchangeable blade. These are shown on the Fokker F IX, with placards, but their suspiciously small appearance is pointed by three weather-beaten screws of different make and larger diameter half hidden under the hangings behind.

### VARIABLE PITCH.

The advantages to be gained by variable pitch, particularly in take-off, climb, and flying with two out of three engines, have induced five French manufacturers and one Italian firm to show airscrews of which the pitch can be varied in flight.

The Savoia-Marchetti type is worthy of first mention because it contributed to a World's record. It was used on the Savoia Marchetti S 64 (500 h.p. Fiat engine) with which Signori Maddalena and Ceccione set up a closed circuit record of 67 hours 15 mins.

Each blade fits, and is rotatable in a separate cylindrical housing which is bolted to a central housing by 25 bolts through flanges. A lever from each blade projects through a slot in its housing and is linked to a spider which is threaded on the airscrew shaft. The sleeve of the spider slides to and fro on the shaft, and varies the pitch of the blades by means of a collar in which it rotates. This collar is threaded into a stationary ring and actuated by a tangential worm gear.

All the types embody this principle in some way or another except the Rateau-Leparmentier.

The Intégrale type has three blades, and instead of varying in pitch by means of links and a collar moving fore-and-aft on the main shaft the projections from the blades are directed backwards into recesses in a collar which rotates slightly in relation to the boss. The rotation is produced by means of inclined slots in a collar moving fore and aft. The ensemble seems the lightest of any.

The Ratier is very neat indeed and has the practical feature of relieving the operating loads by balancing two natural forces. The tendency of blades in action is to flatten their pitch, and another tendency is to fly outwards by centrifugal force. By so designing the Ratier airscrew that the blades screw outwards slightly in coarsening their pitch the mechanical effort is greatly reduced. This one is operated by an electric motor which can be run either way or stopped from the cockpit.

The two forces mentioned above have been employed by Captain Leparmentier in the Rateau airscrew so that it adjusts itself automatically. Success is claimed for this device on the basis of tests with a Breguet 19 (500 h.p. Farman motor). The model shown has four hollow steel blades.

The Levasseur and Bleriot types both seem excessively heavy.

### LANDING-GEAR COMPONENTS.

Landing-gears in the *Salon* show a distinct tendency to narrow down to a plain inverted pyramid for each wheel with an oleo cylinder incorporated in the shock-leg and wheel brakes. Very few machines are without either or both of these two fittings.

The wheels themselves vary very little, and beside the main firms, the British Palmer, the French Dunlop Co., Bergougnan and Hutchinson, a number of others are represented with wheels and tyres.

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# NOTICE TO AIRMEN

**CIRRUS AERO-ENGINES LTD.**

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Caterpillar treads for landing are shown in the military exhibit and on the Vinay stand. They obviously have the advantages of low resistance and ability to negotiate bad ground, but the only one which was not fastened down we found excessively heavy.

A very large proportion of machines in the *Salon* had Messier oleo-pneumatic shock-struts. This device employs a cylinder and plunger with compressed air to provide resilience, and oil-leaks in the piston to take part of the shock and absorb the rebound.

The type exhibited by Vickers and Boulton and Paul on their stands are very similar in principle, and the former firm showed two of the kind used on the Handley Page 42's. Incidentally they take the torsion of the brake action as a bending load.

A neat type of shock-cylinder for skids and tail-wheels is also shown on the Messier stand and on several of the machines.

Brakes take a number of forms, but all the types shown except those on the little German B.F.W. are of the expanding type in a cylindrical drum. The B.F.W. has contracting bands.

Some have shoes operated outwards by cams, and some by oil or pneumatic cylinders. The Palmer principle is well known and seemed to be alone in its type.

Brake operation is not yet standardised to any degree. Pedals on the rudder bar are popular, but a great many of the machines fitted with Messier brakes use a hand lever. A master lever can be set by a rachet, or separate levers which lie along it can be used to operate the brakes separately for steering.

### CONTROLS.

With the exception of the Arens controls in the Puss-Moth no radical departure from the cable, or push-pull rod systems of operating the controls appeared in the machines on the floor. As a substitute for tail-trimming or fin adjustment some machines, such as the Latécoère and Farman series, had narrow trailing edges on their tail surfaces. On the Farman types these appeared only on the rudders and were adjustable on the ground, but the Latécoère 28 and 350 had them on both rudder and elevators and adjustable from the cockpit.

The well-known Arens Controls were represented on a stand which attracted attention by the ingenuity of its display. A small searchlight, manœuvrable in elevation and training by the visitor with two remote levers, was popular, and in several senses illuminating.

On the Bricard stand the Neofix system of irreversible controls was shown. By an ingenious device the operation of the controls is left perfectly normal, but no motion can be imparted to the system from the other end; that is, by applying force to the rudder or ailerons at their trailing edges. Our impression that the device was to counteract flutter was corrected by the proprietor, who only claimed security from damage by wind when a machine so fitted was left in the open. For a saving of expense and complication a good many pilots will no doubt prefer a conservative piece of cord for this precaution.

Remote control of signalling dials, and transmission of fuel gauge, tachometer and other instrumental readings were features of many exhibits.

### ENGINE STARTERS.

Nothing new in principle appeared among the variety of engine starters on view.

The Bendix Eclipse inertia starters, both hand and electric, were well represented on the stand and in aeroplanes. The hand type appeared on the Bristol Mercury engines. A Viet inertia starter made its first public appearance.

The most popular Viet product was the compressed-air starter, which is operated from a compressed-air reservoir and usually includes a hand-compressor-pump in the aeroplane. It is fitted as standard on certain aeroplanes. The Letombe-Luchard is another of similar type.

The Saintin starter employs a fuel mixture, distributed under pressure to the cylinders on a principle similar to that used in the Bristol gas starter.

An electric starter shown on the Farman stand, mounted on a reduction gear case apparently for a large radial engine, takes the form of a direct train of gears without any other principle than that of cranking the engine.

On the Farman stand is also shown the eminently light, simple and effective cartridge device which is in use by *Sabena* and other operating companies. By means of an ordinary breech mechanism the explosion gases from a small cartridge are injected into a cylinder and kick the engine into life.

Superchargers are very much in evidence on the higher powered engines, especially for military purposes. Nearly all of them use a high-speed centrifugal blower. The gearing, and hence the extent of *suralimentation*, varies according to the purpose of the engine. Practically all are mechanically driven, although one exhaust-driven turbine was noted.

All the superchargers have some means of cutting them in or out of action because their use at low levels means damage to the engines. The Bristol type has an automatic device to regulate its action according to the density of the air.

The difficulties of detonation, which are aggravated by the high temperature of the forced draught, particularly in air-cooled high-performance engines, make precaution in the use of superchargers very necessary. Two ingenious ways of overcoming the difficulty appear on different stands and are very well worthy of note.

On the Rateau stand, where a supercharger is shown, there also appears a tubular radiator which is put between the blower and the carburettor so that the forcibly inspirated air passes through the tubes and is cooled before entering into mixture with the fuel. This not only reduces the danger of detonation but also permits a heavier charge to be taken into the cylinder.

The other device is the Farman three-speed supercharger. By an arrangement of gears simple in operation but rather complex in design this blower can be adjusted to give three different degrees of supercharge.

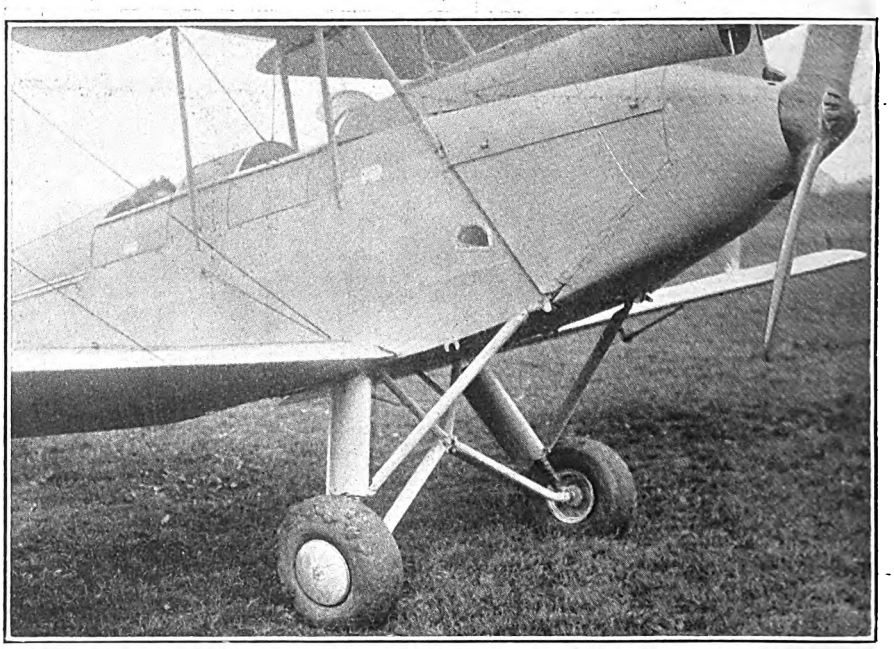
### MISCELLANEOUS ACCESSORIES.

Among the newer proprietary devices is the Mauve series of fuel-release or "dump" valves. By a remote control large-area valves in both top and bottom of a fuel tank can be made to spring open. The upper, and smaller, admits air, and the lower one releases the fuel at a great rate. These are a safety device for long flights, when a forced landing with a heavy load of petrol is dangerous, and are alternative and preferable to the droppable fuel tank.

Besides jettison valves of irrevocable type the Société Mauve also makes valves which can be closed again after the desired lightening effect has been achieved.

The Vickers-Potts oil-cooler, which is shown on the Vickers stand in their very extensive range of accessories, seems to be one of the few devices of its kind in the Show, unless the dignity of a specific name be given to the trombone-like loop of oil tubing on the Argus engine of the B.F.W. All the Argus engines, and some others, in the Tour of Europe employed this means of cooling their oil, and some of the exhibited machines have a fin-like radiator for the same purpose. The popularity of the Vickers-Potts seems to show that oil-cooling is as desirable as the lubrication experts say it is.

Tubing, valves, cocks, pumps and all the paraphernalia of



**THE DOUGHNUT VOGUE.—Dunlop low-pressure tyres on a Gipsy Moth.**

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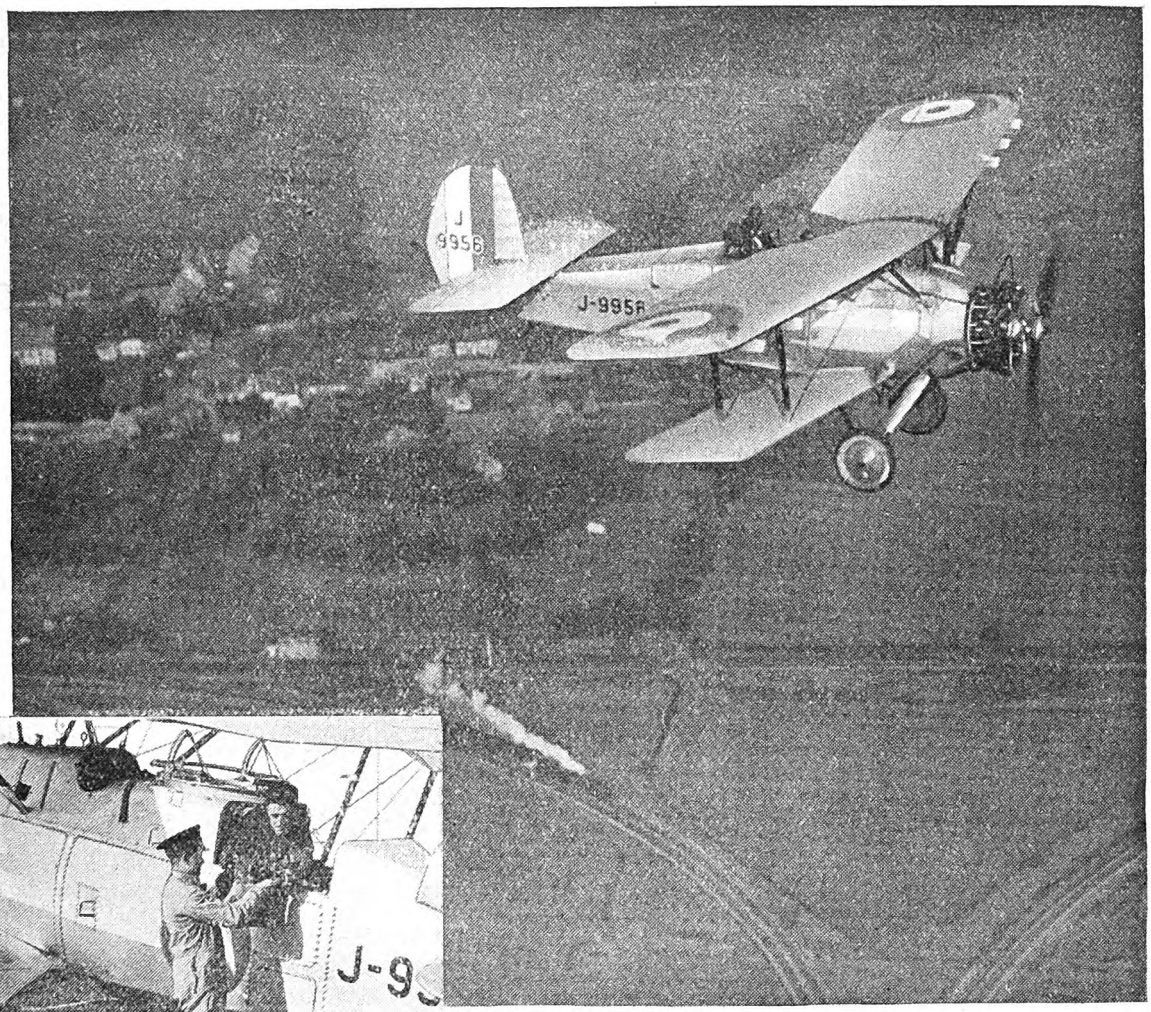


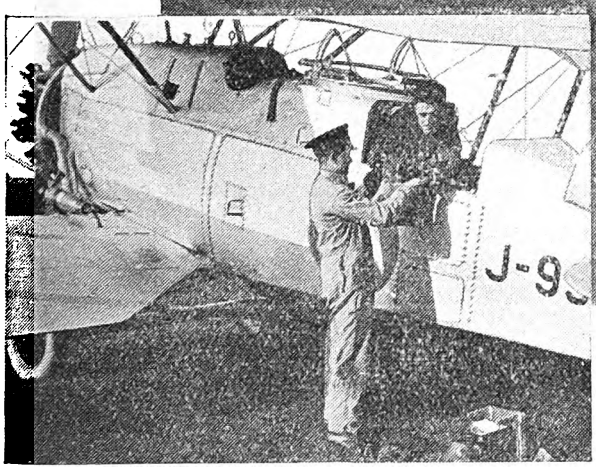


**PHOTOGRAPHY.**

*Top:* The observer taking an oblique photograph of a railway junction.

*Below:* The wireless panel being removed and a vertical camera being fitted.

*Applications of*

# The ATLAS

**THE Armstrong Whitworth Steel Atlas fitted with Armstrong Siddeley Jaguar engine is the standard two-seater aircraft for Army co-operation. It is also used for—**

1. **Artillery observation**
2. **Photography**
3. **Bombing**
4. **Picking up messages**
5. **Reconnaissance**
6. **Advanced training.**

**The Atlas aircraft is produced in the best equipped aircraft factory in the British Empire.**

**SIR W. G.**

# ARMSTRONG WHITWORTH

**AIRCRAFT LIMITED**

**Works and Aerodrome: Whitley, Coventry. London: 10, Old Bond Street, W.1.**



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*canalisation* are plentifully represented. The Vickers range is well displayed and several French firms show complete fuel systems.

The virtues of Superflexit occupy a large section of gallery, and illustrations of its various sizes and applications make an interesting study. So do the exhibitions of at least two makes of non-puncturable envelopes for fuel tanks.

INSTRUMENTS.

Several ingenious instruments appeared on different stands, but nothing that was at once novel and practical. One stand exhibited a course-setting device by which the drift was estimated from the moving panorama below cast onto a ground glass screen by means of lenses. In the same exhibit was the Gyroclinometre, which is really a pitch and bank indicator and was used by at least one machine in the European tour. *Etablissements Kirby Smith* exhibited a full line of the famous Smith's Instruments which contains at least one example of every type of instrument used to-day.

In the special exhibit of *La Ministère de l'Air* an automatic navigator was shown on a stand of its own, all of which it needed. The various components of air-speed, compass bearing, etc., registered themselves automatically inside the central box by means of flexible drives. The wind speed and direction had to be noted by the pilot who adjusted certain dials accordingly. The path of the aeroplane traced itself out on a map which was placed in a visible frame. The ingenuity is beyond question, but most pilots would probably get there better with a C.D.C.

Among the neat and well-tried instruments on the Askaniawerke stand was a distant-reading compass. The external principle is not new, but follows exactly that of the Pioneer Earth Inductor compass with which Charles Lindbergh made his most famous flight. A course-setting dial enables the pilot to adjust the instrument to the desired bearing, and thereafter an indicator dial shows deflection right or left if the aeroplane leaves the appointed course. The Earth inductor type works electrically without a compass needle, but the Askania type uses an ordinary compass needle and registers its movements pneumatically. The chief advantage would seem to be that the compass itself can be placed well away from disturbing influences.

Fore and aft clinometers are coming back into fashion, and several neat forms of this simple instrument were shown. One or two statoscopes and rate-of-climb indicators also appeared.

Nothing new was visible to cheer the night- or fog-flyer and add to his peace of mind. In the military section a Farman F 74 training machine was shown with a hood over one cockpit and an exhibition set-up of the instrument board for flying *sans visibilité*. The only extra instrument was the usual turn-and-bank indicator, seen on all large passenger craft as the *Controleur de Vol*. Some emphasis was laid on the grouping, which is naturally important, but it was all rather elementary.

A model radio beacon in the Ministry exhibit showed a type which has been in long use in the United States and for over a year on some French routes.

Not far away were the French firm of Barbier, Bénard et Turenne, and also the Maison Bréguet and several other specialists in navigation lighting.

LA MINISTERE DE L'AIR.

A large exhibit showed the efforts of the French Government to aid aviation; efforts which seem to be a series of conflicts and were so portrayed.

*La lutte pour la securité* centred largely around *perte de vitesse*, and many were the devices to prevent or give warning of the stall. This feature is very international, and the results seem to be much the same in any language. Some of the devices centred about the indication of incidence, which not only registered on a dial but blew a Klaxon when the attitude became inauspicious.

Another *lutte* was against fire, and a Clerget type heavy-oil engine was shown dissected, but not so far that the design of the injector pumps could be seen.

The *lutte* against *capotage*, although no doubt meritorious, was rather childishly illustrated. A cardboard model, with four wheels, moving spasmodically and vaguely against an impossible background, could hardly have conveyed to the general public any suggestion of nosing over, why, or how not to.

The great merit of the Ministry exhibit was the amount of action. Nearly everything moved, and delighted the crowd accordingly, and in the corridor, where painted continents and oceans marched past beneath the suspended model of MM. Costes and Bellonte, their Question Mark, the crowd was too packed to penetrate. The same was true of the stairs from which a moving picture of the same venture could be seen. The exploit of this couple furnished a popular *motif* for all the exhibitors who could claim the most shadowy connection therewith.

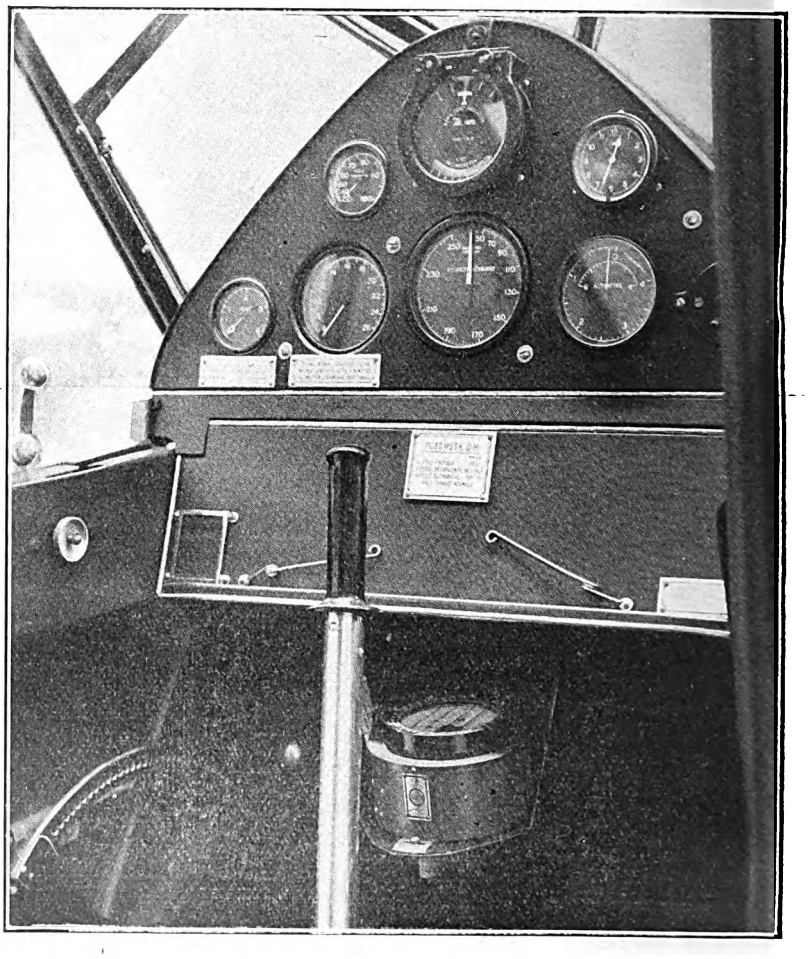
A timely piece of publicity appeared on Nov. 30 when a banner round the Dewoitine D 27 announced the breaking of a new World's record that day. M. Marcel Doret had flown 1,000 km. at the average speed of about 180 m.p.h. The regrettable thing was that the Rolls-Royce stand was not in a position to cap it with a larger and newer banner, as they might easily have done before the end of the *Salon* if some Firefly, Fury, Norn or whatnot had happened to go for a casual stroll under observation.

A disinclination to swank can be carried so far that it becomes almost a kind of national disease, and on the whole the reticence of the British Aircraft Industry at the *Salon*, in spite of the noble die-hards who were there, was positively indecent. The Puss Moth, perforce bashfully hiding its G behind a potted orange grove, might have unfolded quite a tale had it been on a British stand, but as it was a stranger it submitted to massed inspection and admiration without a word.

RAW MATERIALS.

The rawer materials of flying, in the form of metals, fabric, plywood and dope were shown on several stands according to their firms of origin. The casual observer can learn little from the outside appearance of any of these. But the forgings of airscrew blades and crankcases, as well as several kinds of castings, were shown by High Duty Alloys Ltd. on the stand of *Fonderies Debard Société Anonyme*, their sub-licensees, and attracted considerable attention among the technical people.

Of interest to engine manufacturers is the Lumen device for putting piston rings on pistons. This apparently simple operation is a prolific cause of variations in engine efficiency and losses which can neither be traced nor cured with certainty. The chief trouble is the deformation of rings in the process of opening them out to slip them onto the piston. The Lumen apparatus consists merely of an adjust-



**BRITISH INSTRUMENTS.—The control-board of the Puss-Moth at the Paris Show. At the top is the Brown Turn-Indicator (electric). The indicators are Smith's Instruments. And the compass is a Husun.**—(*"Aeroplane" photograph.*)

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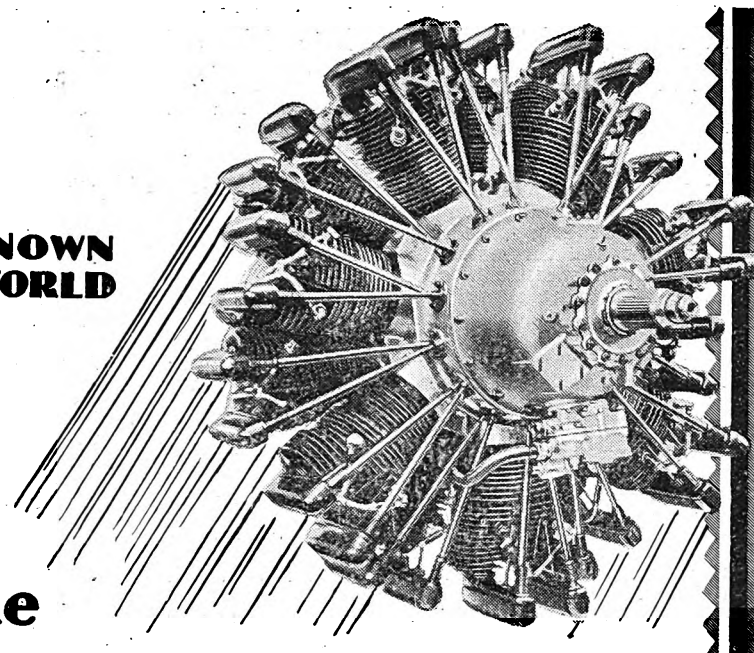
FLOWN AND KNOWN ALL OVER THE WORLD



# The ARMSTRONG SIDDELEY

## JAGUAR MAJOR (GEARED)

THIS geared engine is an improved and more powerful edition of the world famous Jaguar.

Its outstanding qualities are its smooth running and total absence of vibration, ease of installation, simple maintenance and economy of running.

Its performance is equal if not superior to that of any watercooled engine of the same power.

Two types are available. The normal one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the fully supercharged type rated at 510 h.p. at 11,500 feet.

ARMSTRONG SIDDELEY MOTORS LTD., COVENTRY, ENGLAND, and 10 Old Bond Street, London, W.1.

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able semi-circle of metal with grooves on its inner surface to take half the piston ring, or rings. Two jaws project inward through a hole in the back, and they are inserted between the ring ends as they lie in the machine and can be separated by a vice-screw. The rings are forced open as they lie in the grooves but cannot be deformed in the plane of their circle. The piston is then lowered into them and the rings eased on by contracting the jaws.

Several British manufacturers expressed great interest in this device while at the Salon.

The Scintilla Magneto display was very ingenious and attractive, with several magnetos and scores of blue sparks playing in patterns over prepared panels.

Taking it all round the materials, parts and accessories were better worth inspecting in detail than were the aeroplanes. The French are always ingenious, even if they do not come up to our craftsmanship and reliability.

## FRENCH AIRWAYS TO THE FAR EAST.

The Compagnie Air-Orient, a French subsidised air transport company, will, in January, 1930, start a fortnightly air mail service between Calcutta and Saigon, the capital of French Indo-China. Arrangements for re-fuelling are being made at Akyab, Rangoon, Mergui, Chantabun (Siam), and at Rach Gia, a station on the Gulf of Siam, about 150 miles north of Cambodia Point.

Simultaneously with the inauguration of this service the service which the Compagnie Air-Orient at present operates between Marseilles and Baghdad by way of Beirut, will be extended to Karachi.

With regard to the Calcutta-Saigon section of the service Colonel Glaize, Agent-General of the Compagnie Air-Orient in the Far East, was in Calcutta recently to make arrangements for this service. C.A.M.S. 55 twin-engined flying-boats, similar to those used on the Marseilles-Beirut section, will be used, and they will operate from a station on the Hooghly, probably near Ishapore, and a hangar will be built on the shore with a slipway.

When the complete service is in operation mails and passengers will travel by flying-boat from Marseilles to Beirut and thence to Baghdad and Karachi by aeroplane. At Karachi passengers and mail will transfer or be transferred to a train for Calcutta. On the Calcutta-Saigon section the intention is to carry mail at the outset, but when experience has been gained passengers will be carried. The journey in either direction on this section will take about three days.

The purpose of the company ultimately is to extend the service to China and Japan, in both of which countries France has great commercial interests. [And presumably we have none, as there is no talk of a British line in that direction.—ED.]

## THE WESSEX TOUR.

After having been away from her base for nearly two and a half months, the new Westland "Wessex" (three Armstrong Siddeley Genet Major engines), six-seater cabin monoplane recently returned to Yeovil. In this period she has visited 22 civil aerodromes in the British Isles, serving 60 of the most important cities.

She has flown at least 6,200 air miles and during the whole time, in spite of encountering extremely wintry conditions and bad flying weather, she has arrived at her destination on time to the minute with two exceptions only, when she was held up by fog.

In the course of the tour the Irish Sea was crossed twice and on the occasion of the journey from Dublin to Liverpool, the long-sea crossing was taken and the trip of 143 miles was done in the fast time of 1 hr. 20 minutes, in spite of the prevalence of extremely bad weather.

The machine has been demonstrated to over 1,000 of the leading business men and civic authorities of the country. Among these have been the Lord Mayors of Norwich, Hull, Leeds, Newcastle, Belfast, Dublin, Manchester, and Nottingham, and the Mayors of Northampton, Wellingboro, Doncaster, Halifax, Huddersfield, South Shields, Dewsbury, Birkenhead, Salford, Kidderminster, and Ipswich.

At the latter place the Mayor accompanied by his aged father, Mr. Clouting, flew for the first time, and on landing the latter pointed out that he could not have better celebrated his 83rd birthday.

Amongst many other people who showed keen interest in the demonstration were Sir Albert Ball, the ex-Lord Mayor of Nottingham; Col. Shelmerdine, Director of Civil Aviation for India; Alderman Pearlman, the ex-Lord Mayor of Hull; Col. A. Jerrett, of Lewis's of Liverpool; The Chairman and Members of the Belfast Water Board; Commandant Carroll, Chief of the Irish Free State Air Corps; The Directors of Northern Air Lines, Manchester; and the Directors of National Flying Services. Also a number of the Chief Constables of the Cities where the machine was demonstrated, studied the machine, and some flew it.

Throughout the tour the "Wessex" was acclaimed both by the flying community and the business and public interests, as being the first civil aeroplane of a size suitable for use on internal air lines and for private operation, combining the real safety of three engines, low operating costs, and limousine luxury.

It is interesting to note that the machine is of purely British construction.

It is fitted with Dunlop tyres and Bendix brakes, which were fully applied in every one of the 250 landings made, and stood up most satisfactorily to this most stringent test, regardless of the indifferent condition of many of the aerodromes from which the machine has had to operate. A Goodyear low-pressure air wheel takes the place of the orthodox tail skid.

"Ilo" engine oil was used, supplied by W. B. Dick and Co. Ltd. Pratts (Anglo-American) and B.P. (British Petroleum) supplied the No. 1, 80/20 mixture, and it is noteworthy that the Genet Major engines ran admirably on this petrol, which costs the same as the ordinary No. 1 petrol used in motor-cars. The instruments used were supplied by Smiths Aircraft Instruments Ltd.

The dope and paint used throughout on the machine were supplied by Titanine Ltd. Rexine interior decoration, Triplex glass, and Tecalamit greasers go to make the equipment complete.

The Armstrong Siddeley Genet Major engines have B.T.H. Magnetos, Fescolised exhaust-pipes, and Airscrew Co.'s tractor screws.

The tour was managed on behalf of The Westland Aircraft Works by Mr. H. M. Talbot Lehmann, and the flying was carried out jointly between him and Flt. Lt. Louis Paget, R.A.F.O., and Mr. F. J. Brunton, the test pilots of the Westland Aircraft Works.

## A TAXI TO TENERIFFE.

On Dec. 12 Mr. P. F. Scanlan, an insurance broker of Nottingham, arrived at Las Palmas on the Island of Gran Canaria in a Desoutter monoplane (Hermes II), and took the boat to Santa Cruz, a few miles away on Teneriffe.

Mr. Scanlan had wished to reach his father, who was lying seriously ill, so took an air taxi of National Flying Services, Ltd., at the ordinary out-of-England rates, and reached his destination in four and a half days. The distance is 2,080 miles, several sea crossings were involved and bad weather caused some delay. The journey was finished in time, although the elder Mr. Scanlan died a few hours after his son's arrival.

Mr. R. F. Findlay, the N.F.S. pilot in charge of the undertaking, took the course indicated in stages as follows:—

Dec. 8, London—Paris (230 miles).

Dec. 9, Paris—Lyon—Barcelona (555 miles).

Dec. 10, Barcelona—Alicante—Malaga—Tangier—Rabat—Mogador (980 miles).

Dec. 11, Mogador—Agadir (105 miles).

Dec. 12, Agadir—Cape Juby—Las Palmas (180 miles).

Permission to fly over Spain, which is not usually accorded within 72 hours, was available in 32 hours through the kind offices of the Marques Merry del Val, the Spanish Ambassador to England, and this enabled the party, in spite of other delays, to reach Las Palmas in time. The aeroplane could not go beyond because the Island of Teneriffe lacks a landing ground. The Desoutter was, incidentally, the first British aeroplane to visit Las Palmas.

Mr. Hills, an engineer of National Flying Services, Ltd., travelled with the expedition because of its urgency and because the third seat was vacant. No trouble occurred, either with the machine or the Hermes II engine. The taxi is waiting to bring Mr. Scanlan back.

## A BUSINESS TRIP.

On Dec. 8 Mr. Alan Muntz, of Airwork Ltd., set out for Egypt in a Puss Moth. Dame Ethel Locke-King travelled with him because she, too, has business there and believes in the convenience of aeroplanes, although over 60 years of age.

Mr. Muntz is going to look into the aviation situation in Egypt and will spend some time there examining the prospects for business development. Incidentally he has been invited into consultation by the Egyptian Government on certain questions of aerodromes and the subsidisation of flying services.

The party reached Lille on the first day, and Nice on Dec. 9. They flew via Rome to Catania and were held up there for a day by bad weather. On the evening of Dec. 13 Heston got a wire to say that a landing had been made safely at Tunis.

## A HULL TO HAMBURG AIR ROUTE.

In the House of Commons on Dec. 3, in reply to a question by Lieut.-Cmdr. Kenworthy, the Under-Secretary of State for Air said that local interests in Hull were giving consideration to the possibility of establishing an air service between Hull and Northern Europe and that such a scheme might lead to, or be combined with, further lines between Hull and the West. No proposals for such a service had been received by the Air Ministry.

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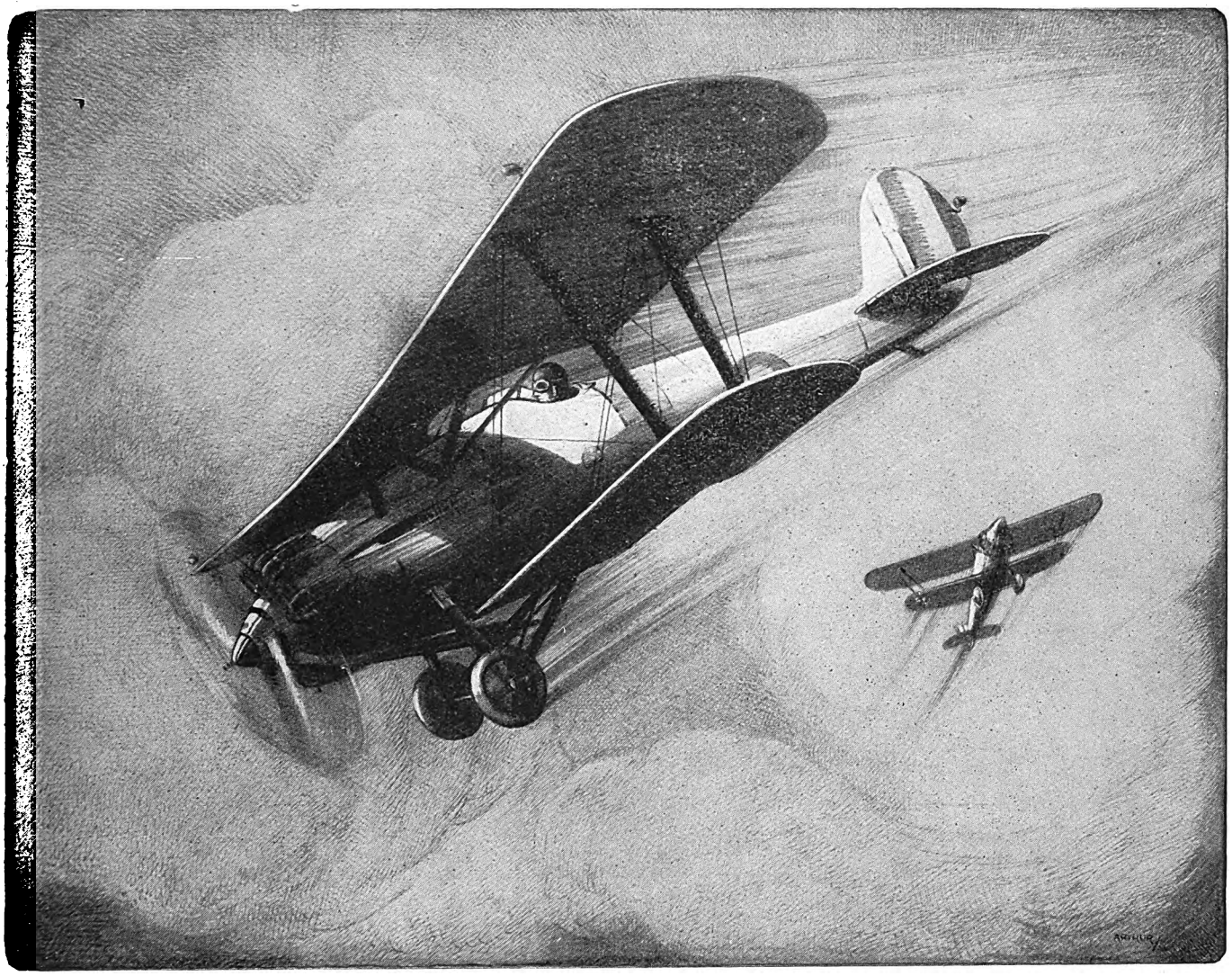

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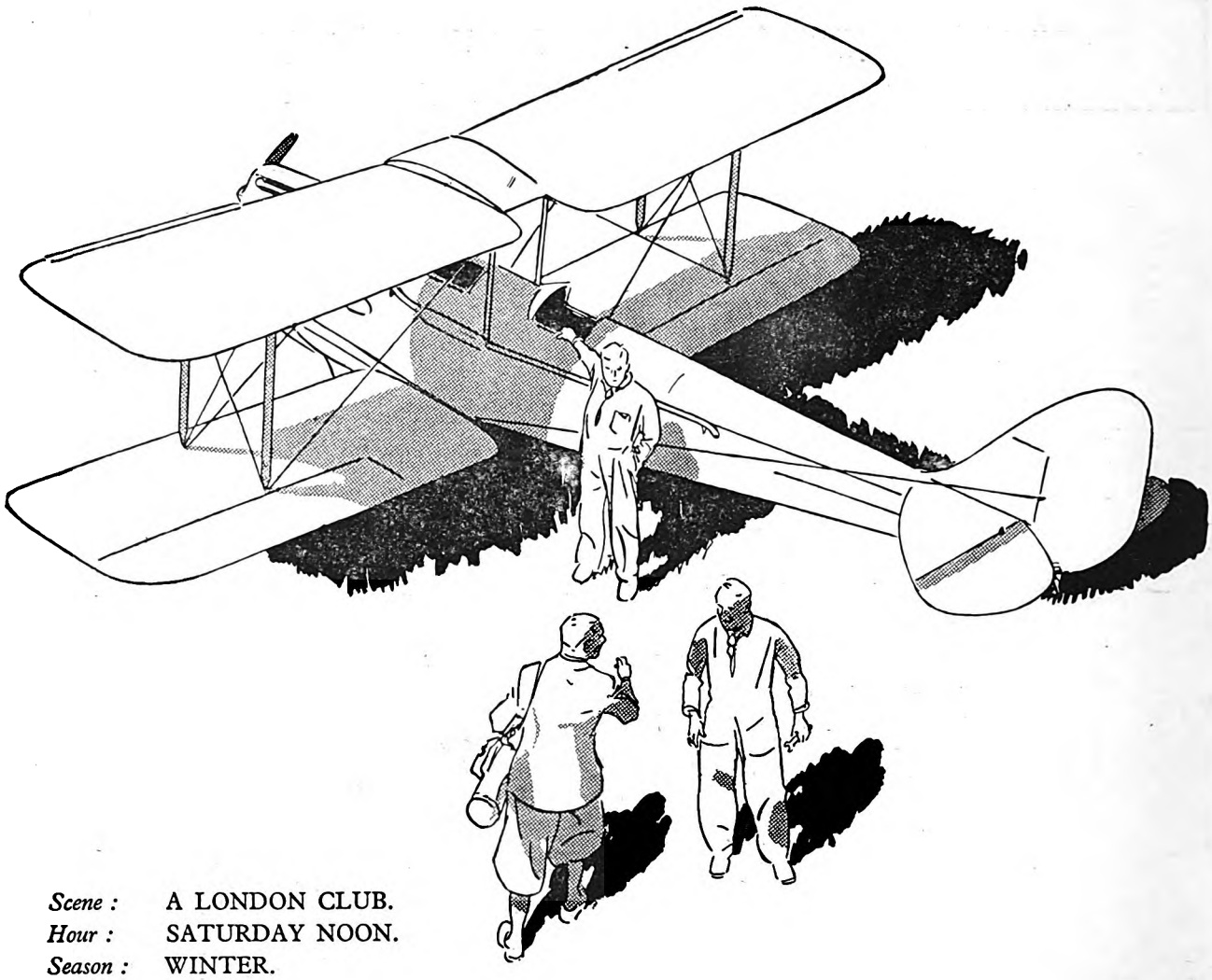

*Scene :* A LONDON CLUB.
*Hour :* SATURDAY NOON.
*Season :* WINTER.
*Time :* PRESENT.

*Member muses :* Sun shining . . . a nip in the air . . . too good to stay in town. A ROUND OF GOLF. Where to play? One's own Club in the suburbs, one supposes . . . h'm . . . crowds . . . *and* crowds. No! *Over the hills and far away, that is where we'll play to-day.* That's rather good! Ah! That new course near Leicester where Brown lives.

(*Aloud*) : " Porter! Telephone to Stag Lane and ask them to get my Moth out, and then to Major Brown at Leicester and tell him I will meet him on the course at 2 o'clock, and have my car sent round at once. Yes, I shall be dining in the Club to-night."

*Exeunt*

# MOTH . . .

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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, December 9.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Lt. J. H. F. Burroughs, R.N., is re-attached to the R.A.F. as a Flg. Off. with effect from Dec. 3, 1929, and with seniority of June 16, 1924 (substituted for the notification in the *Gazette* of Dec. 10, 1929); Plt. Off. on probation P. F. Canning is confirmed in rank (Oct. 21).

Sq. Ldr. E. D. Atkinson, D.F.C., A.F.C., is placed on the half-pay list, Scale A (Nov. 18) (substituted for the notification in the *Gazette* of Nov. 18).

Flg. Off. J. M. Wyer, M.B.E., D.S.M., is placed on the retired list at his own request (Dec. 8); Plt. Off. on probation G. B. Pierpoint relinquishes his S.S. comn. on account of ill-health (Dec. 6); Sub-Lt. M. K. Cavenagh-Mainwaring, R.N., Flg. Off., R.A.F., relinquishes his temp. comn. on return to Naval duty (Nov. 19); Lt.-Cdr. J. H. I. Wood, R.N., Flg Off., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Aug. 10, 1929) (substituted for the notification in the *Gazette* of Aug. 20, 1929).

MEDICAL BRANCH.—Probationary Surgeon Lt. H. T. Rylance, L.M.S.S.A, (R.N.V.R.), is granted a temp. comn. as a Flg. Off. with effect from and with seniority of Nov. 19.

DENTAL BRANCH.—Sq. Ldr. P. E. Brown, L.D.S. (Maj., Army Dental Corps), relinquishes his temp. comn. on return to Army duty (Nov. 24).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Plt. Off. A. Dewsbury is promoted to the rank of Flg. Off. (Dec. 10); Flg. Off. R. H. Maw of the Special Reserve is promoted to the rank of Flt. Lt. (Nov. 2); Flg. Off. M. R. Manks is transferred from Class A to Class C (Oct. 16); Flg. Off. M. F. Ogilvie-Forbes is transferred from Class AA (ii) to Class C (July 17); Flg. Off. S. H. G. Trower relinquishes his comn. on completion of service (April 1) (substituted for the notification in the *Gazette* of Dec. 2).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—The following to be Plt. Off.:—G. F. Anderson (Nov. 10).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE.

Matron Miss K. C. Watt, R.R.C., is appointed Matron-in-Chief (Nov. 29); Miss J. M. Cruickshank, C.B.E., R.R.C., relinquishes the appointment of Matron-in-Chief, and is placed on the retired list (Nov. 29).

## Royal Air Force Accidents.

In the House of Commons on Dec. 10, in reply to a question by Mr. Smithers, the Under-Secretary of State for Air said that the average life of the engines in all Service aircraft which had crashed with fatal results since Jan. 1, 1929, was approximately one year, either from the date of purchase or from the date of what was known as complete overhaul, a process which included the replacement of all parts necessary to bring the engine up to the standard of a new engine.

## A Matter of Accuracy.

A contemporary recently published what purported to be an account of the journey by a Flight of No. 47 (Bomber) Squadron from Khartum to Bathurst, Gambia, and back. In this story the statement was made that "No rumour of any mishap to this flight has been reported." That quotation, which is dated Nov. 28, contradicts directly an account of the flight which appeared in THE AEROPLANE on Nov. 19, in which a description was given of the adventures of two members of the Squadron who were forced to land in the bush for some reason not stated, and the excellent work which was done by them and by other members of the Squadron, and by local officials and the natives of the district, in getting the machine out again.

As the reputation of THE AEROPLANE for accuracy, especially in matters concerning the Royal Air Force, and incidentally its willingness to own up when it does make a mistake, is one of its most cherished traditions, we feel that the statement which appeared in our contemporary must be corrected. Of course one might argue that as nobody was killed and as the machine was repaired and got out, that it was not a mishap. But as the pilot, Flg. Off. Flower, went down with fever and could not finish the journey, as the result of his night out in the bush, that might be regarded by him as a mishap. In any event, all concerned in the incident deserve great credit for good work.—C. G. G.

## A New Squadron.

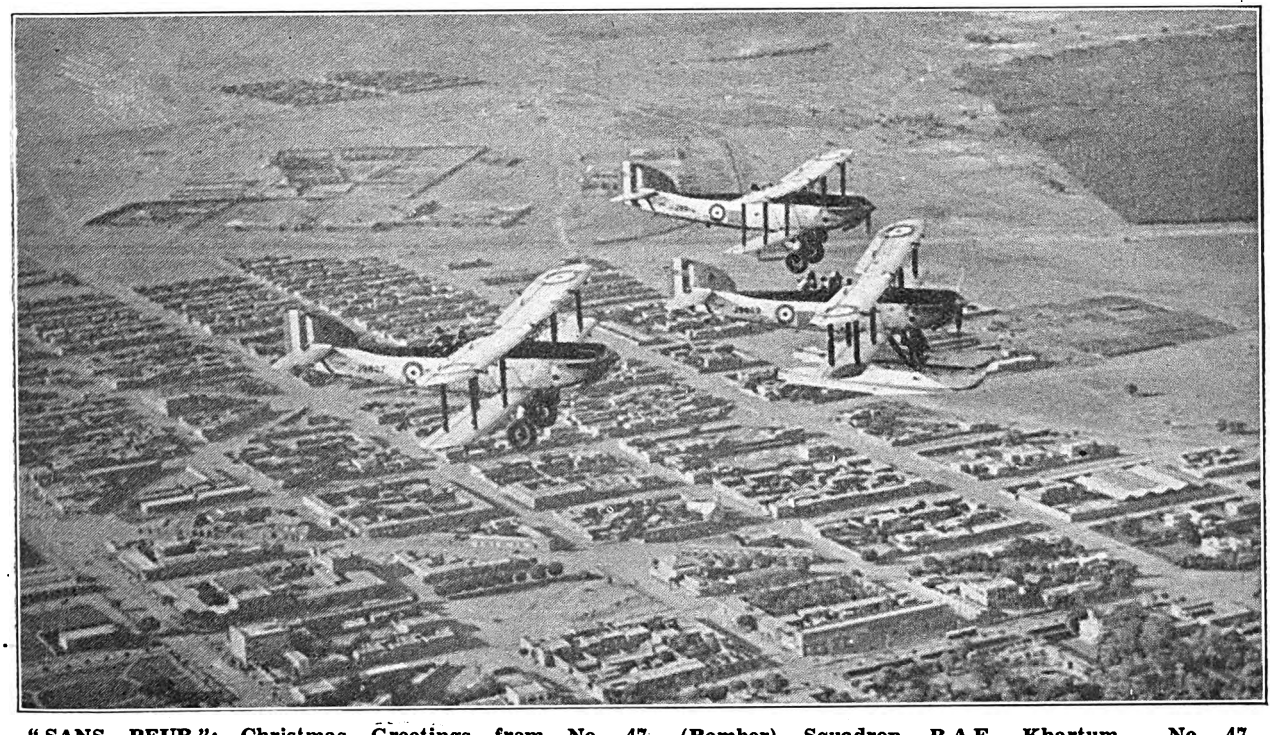
Air Order No. 1834 announces the formation of No. 500 (Cadre) Squadron, R.A.F.

No. 500 (Cadre) Squadron will be formed at Manston on Mar. 16, 1931. The Squadron will occupy the accommodation at Manston recently vacated by No. 9 (Bomber) Squadron, which has moved to the new station at Boscombe Down.

No. 500 is to be a Night Bomber Squadron.

The formation of this Squadron will bring the number of Cadre Squadrons up to five. The existing Squadrons of this type, which comprise a proportion of Special Reserve personnel, are No. 501 (City of Bristol) Squadron, No. 502 (Ulster) Squadron, No. 503 (County of Lincoln) Squadron, and No. 504 (County of Nottingham) Squadron. The new Unit will probably be known as either the County of Kent Squadron or the Isle of Thanet Squadron.

The formation of a Cadre or special Reserve Squadron at Manston has been under consideration for some months. The regular units of the R.A.F. have earned the respect and liking of the population of the County of Kent with the



**"SANS PEUR":—Christmas Greetings from No. 47 (Bomber) Squadron, R.A.F., Khartum. No. 47 Squadron's activities in the past year include the West African Flight to Gambia and back and experimental work on floats over the Nile and the Swamp districts of the Sudan. Their machines are Fairey III.Fs.**

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result that there is certain to be a tremendous demand for Special Reserve service in the County's own Squadron.

The large number of Preparatory Schools for boys in the coast towns of Kent will ensure that dozens of intelligent young men who are masters at these schools will want Special Reserve Commissions in this Squadron, because they can do their training in the long school holidays,—and a man who is an officer and a pilot will have tremendous influence over the younger generation. The Other Ranks should be quite easily recruited from the workshops of the big motor-coach companies which run their services all over the County.

**The Clarkson Trophy.**

The competition for the Clarkson Trophy was held at the Central Flying School, R.A.F., Wittering, on Dec. 9. The competition was divided into three parts: (a) compulsory aerobatics, (b) optional aerobatics, and (c) landing over a tape. Each Flight was represented by a team of two pupils. The judges were Group Capt. J. E. A. Baldwin, D.S.O., O.B.E., Commandant of the Central Flying School, Sq. Ldr. Alan Lees, A.F.C., Officer Commanding No. 56 (Fighter) Squadron, and Flt. Lt. C. Clarkson, R.A.F.O., the giver of the Trophy.

The Trophy was won by "B" Flight represented by Flg. Off. D. S. McDougall and Flg. Off. W. J. H. Lindley.

Three Flying Instructors' Courses are held at the Central Flying School every year, each of which lasts eleven weeks.

**The Schneider Trophy Contest.**

In the House of Commons on Dec. 10, in reply to a question by Mr. Granville, the Under-Secretary of State for Air said that the question of permitting officers of the Royal Air Force to compete in the Schneider Trophy Contest was still under consideration but he hoped that within the next week he would be able to give a more definite answer. The question of Government support was also still under consideration.

**The Staff College, Camberley.**

The following officers of the Royal Air Force have been nominated for admission to the Staff College, Camberley, for the course beginning in January:—Sq. Ldr. A. J. Capel, D.S.O., D.F.C., and Flt. Lt. H. N. Thornton.

**The R.A.F. Staff College Qualifying Examination.**

The R.A.F. Staff College qualifying examination for all candidates from Home Commands will be held at the R.A.F. Depot, Uxbridge, from Jan. 27 to Jan. 30, 1931, inclusive. The arrangements for the examination will be made by the A.O.C. Inland Area, but all candidates should communicate direct with the Commandant, R.A.F. Depot, Uxbridge, concerning arrangements connected with accommodation, transport, etc. A limited number of quarters will be available.

**The Royal Air Force Memorial Fund.**

Air Vice-Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., who has recently arrived from 'Iraq to take up the appointment of Commandant of the Imperial Defence College, has accepted membership of the Executive Committee of the R.A.F. Memorial Fund. He was one of the original members of the Committee in 1919.

At a meeting of the Executive Committee on Dec. 10, the Secretary announced that the following have accepted invitations to join the list of Vice-Presidents of the Fund. The Rt. Hon. the Lord Amulree, G.B.E. (Secretary of State for Air): C. T. te Water, Esq. (High Commissioner for the Union of South Africa): Sir Thomas Wilford, K.C.M.G. (High Commissioner for the Dominion of New Zealand).

A sub-committee consisting of Dame Helen Gwynne-Vaughan, G.B.E. (Chairman), Air Marshal Sir Edward Ellington, K.C.B., Air Vice-Marshal C. A. H. Longcroft, C.B., and the Secretary, was appointed to deal with the Annual Report for 1930, with the view to its production in an abbreviated form.

**R.A.F. Display Finance.**

The net profits of the R.A.F. Display of 1930 amounted to £13,702 10s. and has been allocated by the Air Council as follows:—

Donation to the R.A.F. Memorial Fund, £9,502 10s.; The Officers' Association, £1,000; The R.A.F. Sports Board, £3,000; The Hendon Urban District Council (for disbursement to local charities), £200.

**Extensions of Service.**

The following officers have been selected for extensions of the active list period of their short service commissions:—

GENERAL DUTIES BRANCH (SUPPLEMENTARY LIST).

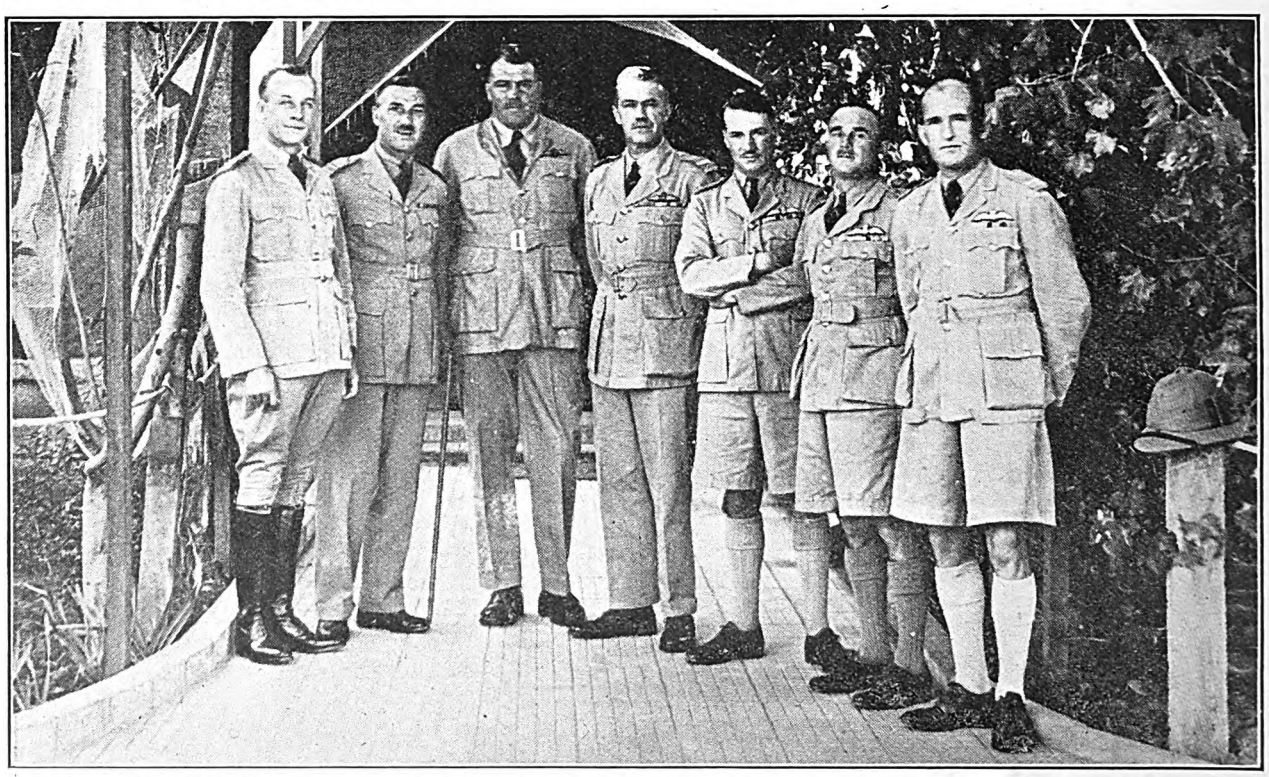
*Extension to 5 years.*—Flt. Lt. R. F. J. Strange.

MEDICAL BRANCH.—*Extension to 5 years.*—Flt. Lt. A. R. French, M.R.C.S., L.R.C.P. Flt. Lt. J. B. Murphy, M.B., B.Ch. *Extension to 4 years.*—Flt. Lt. L. O'Connor, M.B., B.Ch.

CHAPLAIN'S BRANCH.—*Extension to 7 years.*—The Revd. F. G. B. Sutherland.

**Aircraftman Shaw.**

In the House of Commons on Dec. 10, in reply to a question by Mr. L'Estrange Malone, the Under-Secretary of State for Air said that AC. T. E. Shaw [Lawrence of Arabia.—ED.] had sailed for India on Dec. 7, 1926, had arrived on Jan. 7, 1927, and had served in that country until Jan. 12, 1929, when he had embarked for home arriving on Feb. 2, 1929. He had not been granted any leave while serving in India.



**THE PENALTY OF FAME.—A group of former R.A.F. boxing champions who acted as officials at the Middle East Novices Championships at Abu Sueir, on Nov. 12, 13 and 14. Sq. Ldr. A. Garrity (Welterweight, 1921), Flt. Lt. A. J. Adams (Middleweight, 1923), Flt. Lt. P. G. Chichester (Heavyweight, 1925-26-27), Air Commodore A. G. Board, C.M.G., D.S.O. (Vice-President of the R.A.F. Boxing Association), Flt. Lt. G. V. Howard, D.F.C. (Featherweight, 1921-25-26, Lightweight, 1927, I.S.B.A., Bantamweight, 1921, and Featherweight, 1925), Flt. Lt. H. E. Walker, M.C., D.F.C. (Featherweight, 1922-23-24-27), Flt. Lt. H. G. Rowe, D.F.C. (Welterweight, 1922). We gather that no disturbance at the meeting called for action by the officials.**

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# Again and Again and Again and Again!

## 1930 again proves the suitability of Shell Oil and Fuel under all flying conditions—

England to Australia Flight by Mr. F. C. Chichester on a "Gipsy" Moth, using Shell Petrol and Golden Shell Oil.

Duchess of Bedford's Flight with Capt. C. D. Barnard and Mr. R. Little from England to Capetown and back to London on Special Shell Petrol and Golden Shell Oil.

Woman's World Flying Endurance Record—Mlle. Lena Bernstein, on Shell Aviation Petrol and Golden Shell Oil.

Miss Amy Johnson's Flight to Australia on Summer Shell Petrol.

Aga Khan's £500 Prize Flight —on Shell Aviation Petrol and Golden Shell Oil.

King's Cup Race — fastest time round course on special Shell Petrol.

Challenge International Trophy — on special Shell Petrol and Golden Shell Oil.

Air Race round Italy—on Shell Aviation Petrol.

Trans-Atlantic Flight, by Capt. Errol J. Boyd and Lieut. H. Connor on Shell Aviation Petrol and Shell Oil.

World Record Flight (England to Capetown in 8 days) by Mr. F. R. Caspareuthus, on Shell Aviation Petrol and Shell Oil.

World Record Flight (Abyssinia to London in 5 days) by Capt. W. L. Hope on Shell Petrol and Golden Shell Oil.

# SHELL

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### Courses in the R.A.F.

A complete table of the courses of instruction to be held during 1931 in the R.A.F. is contained in a recent issue of Air Ministry Weekly Orders. There are 47 courses altogether and they include flying training, staff work, gunnery, navigation, torpedo, engineering, armament, army co-operation, naval co-operation, photography, signals and specialist courses. The table shows the subject, school, duration, dates, and numbers at the schools. The courses are for officers, airman pilots, and air gunners.

### A Civilian Embarkation Officer Wanted.

Applications are invited by the Air Ministry for the appointment of civilian embarkation officer. The scale of salary is £250-£10-£300, plus Civil Service bonus which gives a range of about £350 to £410. The post will be filled by an ex-officer of the R.A.F. of the rank of squadron leader or above, who must possess a sound knowledge of R.A.F. embarkation procedure.

Applications from serving officers who are about to be retired or transferred to the Reserve or from ex-R.A.F. officers who are employed with the R.A.F. as civilians of officer status if recommended by A.O's.C., should be forwarded through the usual official channels and should reach the Air Ministry not later than Dec. 31.

### The Kabul Operations of 1928-9.

A large coloured picture commemorative of the evacuation by the R.A.F. of the civil population of Kabul in 1928-29 has been issued jointly by Vickers (Aviation) Ltd. and D. Napier and Son Ltd. Any Officer or Airman of the R.A.F. who took part in these operations and would like a copy of this picture is invited to write to Vickers (Aviation) Ltd., Vickers House, Broadway, Westminster, London, S.W.1. A copy will be sent to him, gratis and post free.

### Boxing in the R.A.F.

The following notes on Boxing in the R.A.F. have been received from a correspondent:—

Looking round the Stations there are signs that Boxing is becoming more and more popular. Upper Heyford is the latest addition to the Stations which include Boxing among their sports as they are shortly to run their own Tournament.

Felixstowe has made up its mind that one of the first essentials is a good ring and they have certainly acquired one. It is strongly built and well finished, one of the best in the Service. There is tremendous enthusiasm for boxing at both Martlesham and Felixstowe.

Duxford, a few seasons ago, produced one of the best Junior teams but during 1928 and 1929 there were no matches or tournaments held there. This year, on Dec. 2, an excellent attempt was made to revive the old interest and the Cambridge Amateurs were challenged. The result was a good evening's boxing which everyone enjoyed in spite of the cold.

On December 5 an Imperial Services Boxing Association team went to Birmingham to box a team of the Irish Civil Guards. The Services team included Flg. Off. MacLean, Sjt. Harper, AC. Munkley, and AC. Mason, of the R.A.F. MacLean and Harper won their fights.

### Inter-Services Boxing in Egypt.

The R.A.F. (Middle East) Novices Boxing Team beat the Army in Egypt by nine fights to five at Abbassia, Cairo. Each Service entered a team of fourteen competitors, two of each weight except flyweight and heavyweight when only one was selected.

The R.A.F. success was particularly creditable considering that the Army in Egypt has a strength of about 10,000 and the personnel of the R.A.F. in the Middle East are hardly a quarter of that number.

The R.A.F. team were coached by Flt. Sjt. J. Stone, the R.A.F. Lightweight Champion from 1919 to 1926, L-AC. McAvoy, Lightweight Champion of All India 1919 to 1923 and Egypt 1929-30, and Corporal Borland.

The names and stations of the members of the winning team printed below the accompanying photograph show that the men came from some of the most distant stations in the Command.

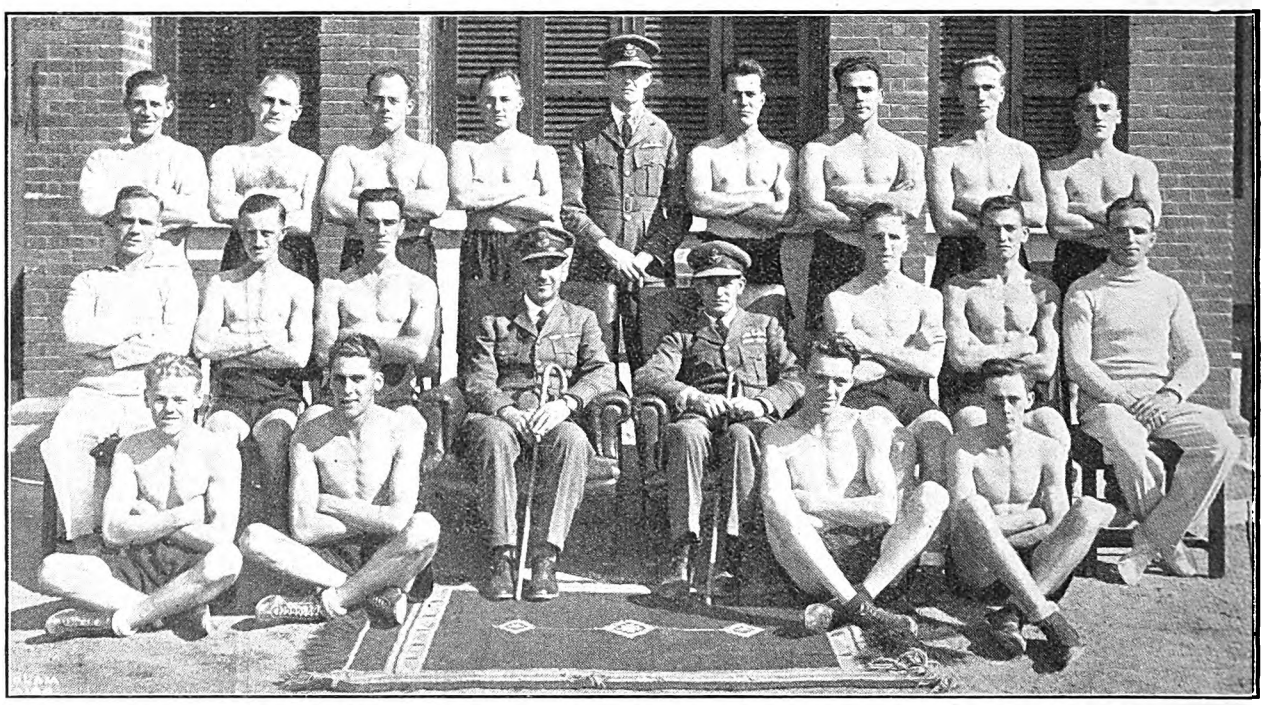
### Rugby Football.

The first Rugby Football match by the R.A.F. representative team will be played against the Police at Imber Court on Jan. 3, kick-off at 14.30 hours. The following team has been selected:—*Full back*: Flg. Off. G. M. Ievers. *Threequarters*: Flt. Lt. G. D. Harvey, Flt. Lt. F. S. Hodder, Plt. Off. P. B. Coote, L-AC. A. Robinson. *Halves*: Flg. Off. J. G. Llewellyn, Plt. Off. G. R. A. Elsmie. *Forwards*: Plt. Off. G. M. Gillan, L-AC. Gibbs, L-AC. A. Simmonds, Plt. Off. R. L. Wallace, Flg. Off. Constantine, Flt. Sjt. W. Kerby, Flt. Lt. G. R. Beamish, Plt. Off. W. McKechnie.

### The R.A.F. Medical Service Dinner.

The tenth Annual Dinner of the R.A.F. Medical and Dental Services was held on Dec. 12 at the Hotel Great Central, London. Among the Guests were Doctors A. M. H. Gray and H. Pritchard and Mr. Girling-Ball. The following were present:—

The Director of Medical Services, Air Commodore J. McIntyre, Lieutenant-General Sir Matthew Fell, Air Commodore H. V. Wells;



**INTER-SERVICE CHAMPIONS:—The R.A.F. (Middle East) Novices Boxing team which beat the Army (Middle East) at Abbassia, Cairo, two weeks ago. Back row: Cpl. Borland (Khartum), Cpl. Giblett (Cairo), L-AC. Gregory (Helwan), L-AC. Burchett (Cairo), Flg. Off. Pelly, Cpl. Templeton (Helwan), AC. Howard Heliopolis), Sjt. Sear (Heliopolis), L-AC. Simpson (Abukir). Middle Row: L-AC. McAvoy (Heliopolis), L-AC. Stigger (Abu Sueir), AC. Hunt (Abu Sueir), Flt. Lt. A. J. Adams (Hon. Sec. R.A.F.M.E. Sports Control Board), Flt. Lt. H. G. Rowe, L-AC. Halliday (Khartum), L-AC. Stanford (Ramleh), Flt. Sjt. J. Stone (Team Captain). Front Row: L-AC. Sadler (Ismailia), L-AC. Drury (Abu Sueir), AC. Wallis (Jerusalem).**

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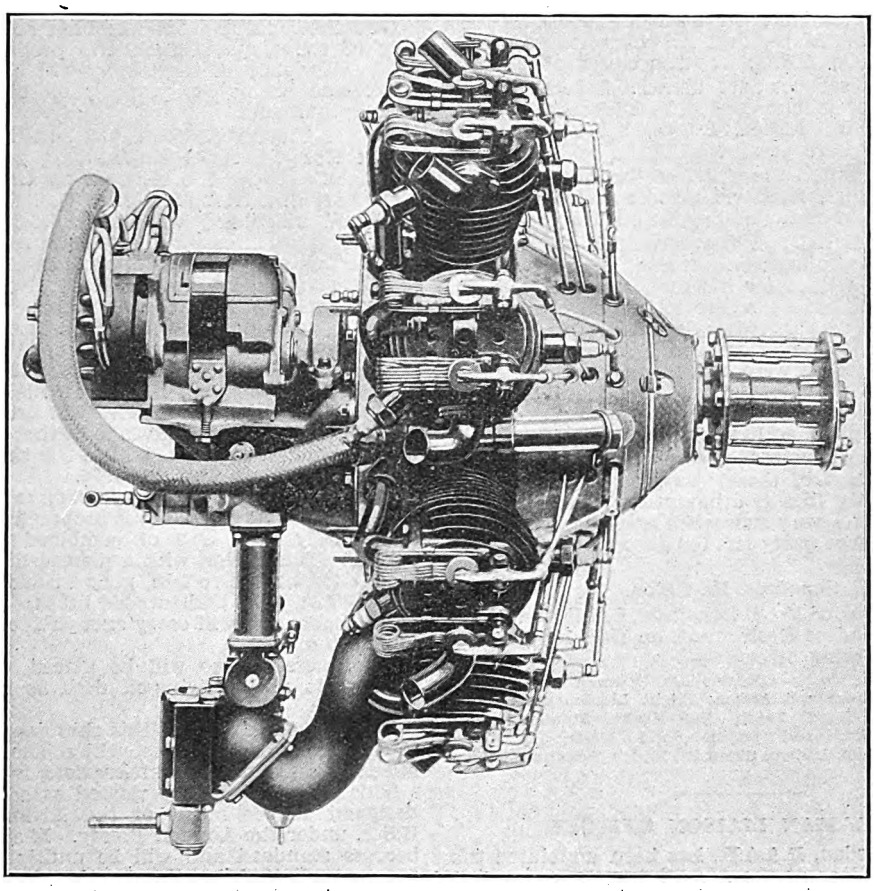
# Constructed to the highest standards of British Practice-



ALL over the world, British standards of inspection are recognised as the highest possible in the building of aero-engines. This rigorous control of every stage of construction ensures the reliability of every British Salmson engine. And ideal conditions for control obtain in the British Salmson works—as up-to-date in layout and tooling as any in the country.

Thus, in the British Salmson range, proved brilliance of design is re-inforced by sound material and accurate workmanship. The result is an engine of which any light aeroplane owner will be proud.

# BRITISH SALMSON AERO ENGINES LTD.

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Group Captains Cooper, MacGregor, and Richardson; Wing Cdrs. Colbran, Cowtan, Duck, Grant, Hewat, Knowles, Macdonald, Overton, Playne, Rankin, Smartt, Treadgold, and Tyrrell; Squadron Leaders Barr-Sim, Biggs, Briscoe, Boddie, Burton, Dickson, Gray, Hodgins, Johnson, Kyle, Landells, Macdonald, Maclaren, Marshall, Maxwell, Rutherford, Ryan, Stalker, Starkey, Valerie, Ware, Wilson, Wheeler, Woodiwis, and Wood; Flight Lieutenants Ballantyne, Barnes, Bell, Charlesworth, Gregor, Hadsley-Bennett, Harvey, Hill, Humphreys, Kilpatrick, Leahy, Lipscombe, Nicolls, O'Regan, Palmer-Jones, Parry-Evans, Paton, Perkins, Potter, Rear, and Russell; Flying Officers Piggott and Griffiths; and Captain Bloom.

### No. 3 Squadron Re-Union Dinner.

The eleventh annual Re-Union Dinner of No. 3 Squadron, R.F.C., and No. 3 (Fighter) Squadron, R.A.F., took place at the Trocadero Restaurant on Dec. 5. The Chair was taken by Air Chief Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O., LL.D., and Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., was the Guest of Honour.

Forty-five members sat down to dinner. Several former Commanding Officers, including Air Vice-Marshal Sir R. Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., the first Commanding Officer, were present.

In a speech after dinner, the Chief of the Air Staff read messages of good wishes, from old members who were unable to be present, from as far as Egypt and 'Iraq.

Unfortunately Sq. Ldr. C. A. Stevens, M.C., the present Commanding Officer, was unable to attend, owing to illness. There were so many wishes for his early recovery and return to the Squadron that he is sure to be well again soon. Flt. Lt. John Oliver, A.F.C., who deputised for Sq. Ldr. C. A. Stevens, M.C., spoke of the work of the Squadron during the year. Speeches were also made by Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., and Flt. Lt. L. G. Nixon. The latter, while serving with No. 3 (F) Squadron, was taken prisoner 13 years ago to the day.

Till midnight impromptu turns were given and many a line was shot. The best of these was that of a Squadron Leader who apparently flies Southamptons inverted.

At the conclusion of a very successful and cheery evening at the Trocadero, a large party left for an unknown destination.

### No. 41 Squadron Re-Union.

The Re-Union Dinner of No. 41 Squadron, R.F.C. and R.A.F. was held at the Trocadero Restaurant, on Dec. 13, and was attended by the following officers:—

Group Captain Landon, Wing Commanders Bowman and Sowry; Squadron Leaders Huskinson and Aitken; Flight Lieutenants Sanderson, Hilton, Spackman, Bond, Leach, Hale-Munro, Staniland, and Edwards; Captains Baker and Moline; and Messrs. Andrews, Arbuthnot, Appleton, Wilson, Bishop, Sampson, Mutch, Bellairs, Mouatt, and Fowler.

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### THE AUSTRALIAN LIAISON OFFICER.

Sq. Ldr. T. R. Marsden, R.A.A.F., has been appointed the Australian Liaison Officer at the Air Ministry in succession to the late Sq. Ldr. W. Palstra, M.C., R.A.A.F., who was killed in the R.101 disaster.

### EDUCATING HENLOW.

A very interesting paper by Mr. Fred Sigrist, on "Some Notes on Metal Construction," was read at Henlow on Dec. 12. In it Mr. Sigrist discusses various forms of metal construction and illustrates the method utilised in the Hawker machines,—which were fully described by him in the *Aeronautical Engineering Supplement* of The Aeroplane some time ago.

### THE EARLY C.F.S.

A reader of The Aeroplane is very anxious to get copies of the photographs which were taken of the officers who composed the first and third courses at the Central Flying School. Will any reader who has in his possession any photographs of either of these courses and who has no objection to copies being made from them, be good enough to lend the photographs to the Editor of The Aeroplane, 175, Piccadilly, London, W.1?

### WATCH THE BEETLES.

A rumour is going about to the effect that a recent examination of certain war-time design aeroplanes which are still in use in a few R.A.F. squadrons, has revealed the fact that some of the essential wooden members are infested with the death-watch beetle.

Application is to be made to the Society for the Preservation of Ancient Monuments for a grant to undertake the necessary strengthening of the structures and also to obtain an assurance that their export to the U.S.A. will be prohibited.

One hopes that this matter will be taken up by the Authorities. A question in Parliament by Mr. Harry Day would probably give this the publicity that it needs.—L. B.

### THE SEGRAVE MEMORIAL FUND.

The Segrave Memorial Fund has now been closed, as the donations, which were headed by the Prince of Wales, are adequate.

An awarding committee, consisting of representatives of the Royal Automobile Club, the Royal Aero Club, the Marine Motoring Association, the Newspaper Proprietors' Association, the Institution of Mechanical Engineers, the Royal Aeronautical Society, and the Institution of Automobile Engineers, will sit each January to review the achievements of the previous year, and the memorial trophy will be awarded to the British subject of either sex who, in their judgment, has accomplished the most outstanding demonstration of the possibilities of transport by land, air, or water.

One thousand pounds has been set aside to defray the cost of the trophy, which will probably be a triptych in gold. A replica of the trophy will be given to the holder, to become his or her property on each occasion that the award is made.

### NEW AMERICAN AIRCRAFT CARRIERS.

The Newport News Shipbuilding and Drydock Company has been awarded the contract for the building of a 13,800-ton aircraft-carrier for the U.S. Navy. The cost of hull and machinery will be $15,560,000 and the total cost will be approximately $19,000,000. Armour and armament for the new ship will cost approximately $3,440,000, and these will be supplied by the U.S. Navy Department.

The vessel will be the first aircraft-carrier in the U.S. Navy to be built as such, as the existing carriers are all conversions from other types of naval vessels.

The London Naval Treaty allows 135,000 tons of aircraft-carriers each to Great Britain and the United States. The completion of the new carrier will bring the American tonnage to 79,800, which leaves a further 55,200 tons for future construction at any time within the time limit of the Treaty which expires on Dec. 31, 1936.

In the new U.S. Navy programme which has just been brought before Congress it is proposed to lay down next year an entirely now type of combined cruiser and aircraft-carrier. This design with a displacement of 10,000 tons will mount ten or twelve 6-in. guns in addition to a strong battery of A.A. guns and torpedo tubes. She will have a speed of 32½ knots and will carry enough fuel for a cruising radius of 12,000 miles.

All superstructure will be placed on the extreme starboard side of the flying-off deck as in the *Lexington* and *Saratoga*.

Whether the design of this ship does not conflict with the Washington Treaty rules, which sharply differentiate between cruisers and aircraft-carriers, is a moot point.

This ship is definitely classed as a cruiser and has been designed as the result of the advantages gained by the U.S.A. under the London Treaty. If successful the type will become standard and will be multiplied to the maximum tonnage allotted by the London Treaty, which looks as though America has successfully discovered a means of circumnavigating the Washington Treaty, in-so-far as aircraft-carriers are concerned. Which just about shows the real value of Disarmament Talks and Conferences.

### THE DIRECTOR OF CIVIL AVIATION.

In the House of Commons on Dec. 10, in reply to Capt. H. Balfour, the Under-Secretary of State for Air said that he hoped to be able to make an announcement on the subject of the appointment of a new Director of Civil Aviation in the course of the next week or so.

### A ROYAL LANDING GROUND.

On the authority of the Journal of the Norfolk and Norwich Aero Club, His Majesty the King has decided to have a permanent landing ground laid out in the grounds at Sandringham, Norfolk.

### LANDING GROUNDS.

During the past year National Flying Services, Ltd., have picked 107 landing grounds in various parts of the country. Many of them may be made available for private flying and N.F.S. air taxis; a few may be acquired or reserved for development into fully equipped aerodromes. Meanwhile, as Sir Alan Cobham points out, they help to fill the gaps between recognised aerodromes and therefore add considerably to the convenience and safety of flying. This truth will be endorsed by all those who have occasion to fly across certain English counties.

### AEROPLANE POSTCARDS.

Two sets of "Aeroplane" postcards are now available and may be had on application to the Photographic Department, The Aeroplane, 175, Piccadilly, W.1. Set "A" consists of the Sidestrand, the Hart, the Bulldog, the Wapiti, the Fairey IIIF. and the Horsley. Set "B" consists of the Fury, the Firefly, the Ripon, the D.H. Intercepter, the Gnatsnapper and the Fox.

Each machine is flying. The postcards are 2s. a set post free.

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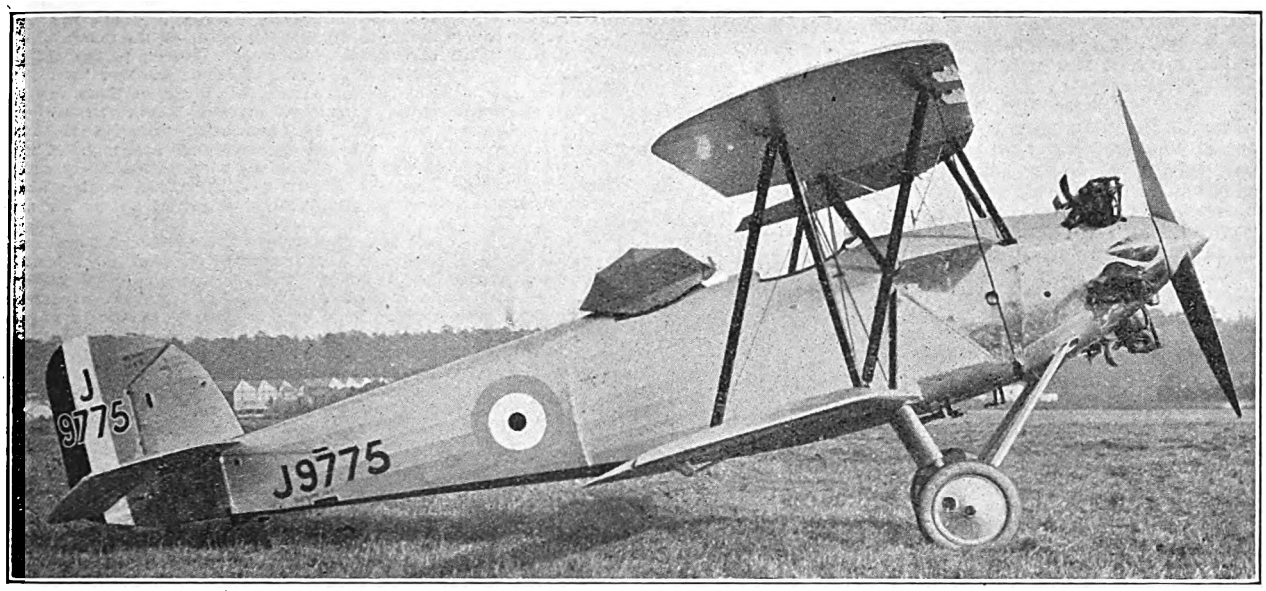


(" Aeroplane " photograph.)

The Hawker "TOMTIT" with Mongoose Engine and "blind flying" equipment fulfils all the exacting requirements of Training Aircraft. The performance, structural features, easy maintenance and economical service render it the ideal type for ab initio and advanced training.

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# THE AKROYD-STUART MEMORIAL LECTURE.

The late Mr. Herbert Akroyd-Stuart left £700 to The Royal Aeronautical Society with instructions that a prize was to be given every two years for the best paper on The Origin and Development of the Heavy Oil Engine. The prize is open to members and non-members of the Society and the value of the prize is about £68.

This year the prize was awarded for the first time. The winner was Mr. D. R. Pye, M.A., F.R.Ae.S., Deputy Director of Scientific Research, in the Air Ministry. Limitations of space in THE AEROPLANE make necessary the compressing of these lectures to a size that will fit, and as the greatest proportion of its readers are practical men, the gist of the lectures which have been read before a Scientific body are presented shorn of the more abstruse technicalities;—not that these remarks really apply to Mr. Pye's lecture, for he has that rare gift of making quite clear to the laymen matters of the highest scientific import.

Therefore we give an example of his style and suggest that his conclusions may well be read before the mass of evidence which preceded them.

He says:—"Finally by way of throwing a bone of contention into the arena of discussion, let me return for a moment to the question of names. I have said that the impracticability of Diesel's first hopes for his engine is no good ground for questioning his fatherhood of the modern high-compression and high-efficiency engine.

"As for the class of so-called 'semi-Diesels,' considering its strong family likeness to the offspring of Akroyd-Stuart there can be little doubt where its true ancestry is to be found.

"Wishing to avoid controversy one might advocate the 'compression-ignition' and the 'hot-bulb' as two names both descriptive and innocuous; but if there is much in a name, there is even more in a short name, and personally I am for Diesel when Diesel is appropriate; and as for all those bastards which now claim a discreditable kinship as semi-Diesels, let us make of them honest Akroyds."

So much for Mr. Akroyd-Stuart and his true position with regard to the development of the Diesel engine. In his paper Mr. Pye is concerned to outline first the historical development of the heavy oil engine, then to deal with the problems of the adaptation of the engine for aircraft and the cycles together with the modes of operation employed; he then outlines the results obtained by research with single cylinders, from which he goes to practical developments and future progress.

Those who think that this country is behind in the development of heavy oil engines should take heart from the fact that an engine based upon the Rolls-Royce Condor is already running as a heavy oil engine and that another engine based upon the Rolls-Royce F engine will be ready in two months.

### EARLY HISTORY.

Mr. Pye opens his lecture by briefly recounting some salient features of the career of Mr. Akroyd-Stuart and mentions that between the ages of 21 and 26 he took out several patents for the improvement of oil engines. Later, in association with a Mr. Binney, more patents were taken out, three of which form the basis of the "Akroyd cycle" and the widely used Hornsby-Akroyd oil engine, for Mr. Akroyd-Stuart sold the manufacturing rights to Richard Hornsby and Sons, of Grantham.

About 1900 Mr. Akroyd-Stuart went to Australia and although he was elected a member of the Institution of Mechanical Engineers in January, 1901, his absence in that country must have been largely responsible for the almost complete absence of his name from the proceedings of that Institution during the ensuing twenty years. These twenty years saw the rise to fame of Dr. Rudolf Diesel, whose first English patent was in 1892.

Commenting upon the fact that in the two most important papers upon this subject in England, one by H. Ade Clark in 1903 and the other by Dr. Diesel himself in 1912, both before the Institution of Mechanical Engineers, the name of Akroyd-Stuart does not once appear, Mr. Pye says that something less than justice was done to Mr. Akroyd-Stuart in his lifetime as a pioneer of the heavy oil engine.

The chief point of interest is to trace the true parenthood of the heavy oil engine that is to be: and to decide whether there is to be found in the ideas of one more than the other of these two men a grasp of the essential principles without which an aero-engine could never come to birth. The one basic principle is that the heavy oil aero-engine must be an engine of high economy. There are fundamental reasons why the weight per b.h.p. of the heavy oil engine should always be greater than that of the petrol engine and this must be offset by the reduction of the weight of a fuel for a given flight.

Mr. Pye says that the inventions of Mr. Akroyd-Stuart can be seen as those of an ingenious and very practical man bent upon improving engines as he knew them step by step. All his engines were low compression engines with a separate combustion space heated externally for starting. This was connected to the rest of the cylinder by a narrow orifice.

Having tried the plan of compressing air only and introducing fuel at the end of compression Akroyd-Stuart returned to the plan of introducing his fuel during the suction stroke and keeping it separate in his vaporising chamber. There is no indication that he thought of the possibility of securing ignition by raising the compression temperature or that he realised the possibilities of improved economy offered by such an increase in the compression ratio.

Dr. Rudolf Diesel's ideas, derived from sound theory and no practical experience, range far beyond any engine of his day. Mr. Pye says of a quotation from Dr. Diesel's rather verbose specification that in it we have the two essentials of the modern high-speed high-economy heavy oil engine. First is the introduction of the fuel after compression and its ignition by the compression heat of the air only, with all the complications of igniter and vaporising chamber eliminated. Second is the provision for a high economy by cooling the cylinder gases after combustion through a large expansion ratio.

The fact that his dream in all its impracticable optimism could not be fully realised must not blind us to his having laid down for the first time the essential features of the modern high-economy engine, and to his being therefore, more than any other man, its true originator.

Mr. Pye is anxious to correct the idea that injection with air should be associated with Diesel and airless injection with Akroyd-Stuart; although such injection with air has been used as a practical expedient with Diesel engines there can be little doubt that Diesel originally conceived his engine as working with airless injection of the fuel.

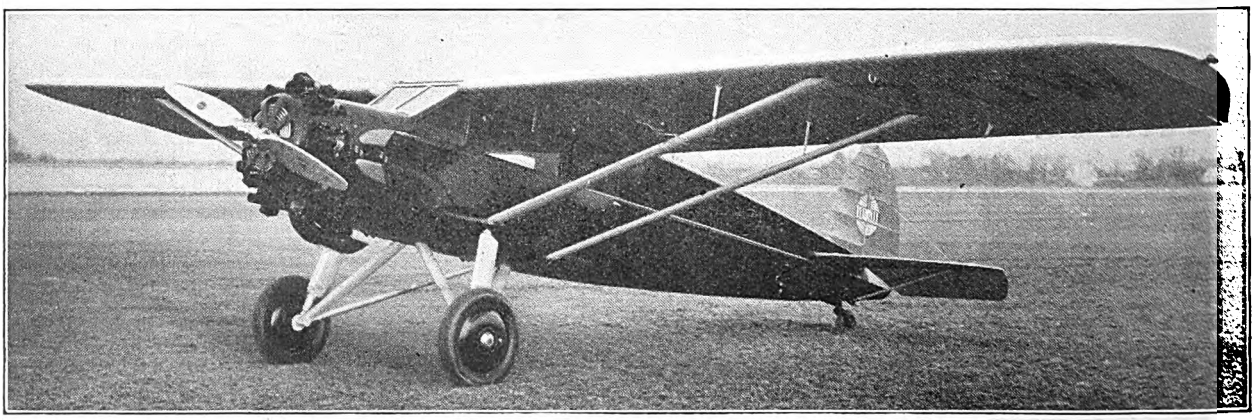
### ADAPTING THE ENGINE FOR AIRCRAFT.

The aero-engine designer has already succeeded in producing a petrol engine with a weight per b.h.p. of less than 2 lbs., whereas the average motor-car engine has a figure of 15 lbs. at maximum power. As the heavy oil engine in the stationary form has been proved to have outstanding economy in fuel consumption and offers advantages such as the sweeping away of electrical ignition, the use of a cheaper fuel at a higher thermal efficiency and the reduction of fire risks, the aeronautical engineer is tempted to see whether this engine cannot be adapted for aircraft.

Mr. Pye points out that as the effective weight of a power plant is the total weight of engine and fuel, the longer the journey the more important the reduction in the consumption of fuel. Because of its greater range such economy of fuel consumption offers most to the airship.

The airship designer therefore is more ready to put up with a relatively heavy engine than the builder of the aeroplane. The R.101 was propelled entirely by heavy oil engines and although these were undesirably heavy the development of a satisfactory power unit of this type for airships is certain before long. Its application in this way would provide the necessary conditions for trying out under other than ground level conditions until the more exacting requirements of heavier-than-air craft can be met.

Although improved economy follows upon increased compression in the petrol engine a limit of about 8:1 is set by temperature, for at this ratio the mixture reaches a temperature at which it will ignite. In practice the figure is about 6:1 because of detonation. But the heavy oil engine compresses only air and therefore a much higher



**AN AMERICAN EXPERIMENT.—The Verville Aircoach with a 225 h.p. Packard Diesel radial air-cooled engine.**

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# THE FOKKER DXVI SINGLE SEAT FIGHTER, FITTED WITH TOWNEND RING

which won the recent Roumanian Military Aircraft Competition, has a *maximum speed at* 15,000 *Ft. of over* 200 *M.P.H.*

**This performance was only possible with the aid of the Townend Ring.**

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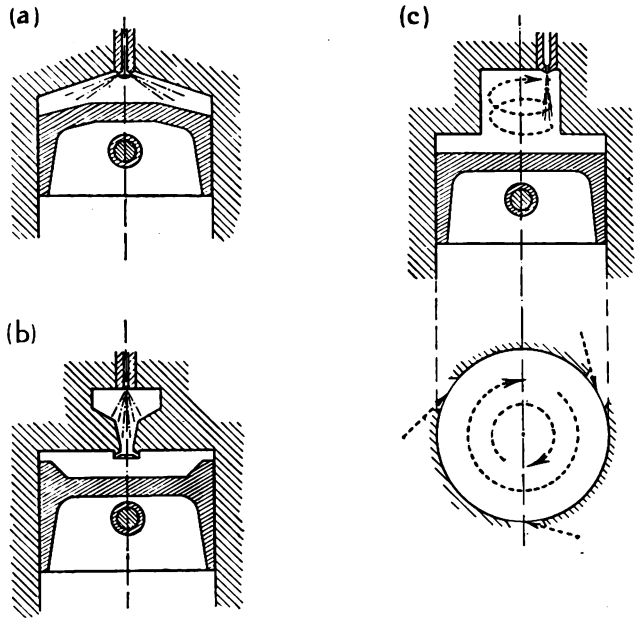


**The three methods of fuel injection: (a) directed spray, (b) pre-combustion chamber, (c) organised air-swirl as developed by Mr. Ricardo.**

compression and expansion ratio can be used with consequently higher economy. The fuel is introduced at near the top of compression when the temperature is about 600 deg. C. It is then vaporised and ignited by the hot contents of the cylinder.

But this operation of mixing and ignition has to take place in a very short space of time, about 1/60 of a second in an engine running at 300 r.p.m. and about 1/400 at aero-engine speed. The weight and complication of the air compressors which are used for the pulverisation and distribution of fuel in commercial types put such a system out of court for an aero-engine.

For this reason a system of fuel injection has been developed which is independent of high pressure air, the liquid fuel is squirted in a fine jet or spray under direct pressure from a pump plunger. Provided satisfactory mixing of the fuel with the air and proper combustion can be achieved, a compression ignition engine with its higher expansion ratio may be expected to consume a smaller weight of fuel per h.p. than a petrol engine. As the effective weight of a power plant is the total weight of engine and fuel this improved economy will affect the admissible weight per h.p. of the compression ignition engine.

With its certainly attainable consumption of .4 lb. of fuel per h.p. hour as compared with say .55 lb. for the petrol engine the total weight of engine and fuel would be the same for a flight of ten hours' duration if the engine itself weighed 3 1/2 lb. per h.p. against 2 lb. per h.p. of the petrol engine. Things are even better if cruising conditions (at 2/3 rated h.p.) are taken, as under these the compression ignition engine should maintain its very best economy whereas the reverse is the case with the petrol engine. There are probably few petrol engines operating under cruising conditions with a specific fuel consumption of less than .6 lb. per b.h.p. hour.

The petrol engine with its weight of 2 lbs. per h.p. maintains a b.m.e.p. of 130 lbs. per sq. in. up to speeds of 2,000 r.p.m. and higher corresponding to average piston speeds of about 2,300 ft. per min. The highest b.m.e.p. obtained with direct injection engines in commercial use is between 70 and 80 lbs. per sq. in. at piston speeds of 1,500 ft. per min. and this in comparatively large cylinders.

Thus we can gain some idea of the magnitude of the problem for only by increasing the piston speed to about 2,000 ft. per min. in smaller cylinders and maintaining the b.m.e.p. at at least 100 lbs. per sq. in. can the weight-power ratio of the heavy oil engine be brought within the range of possibility for use in the air. From an engine of the same size and weight we should then obtain 2/3 of the output of a similar petrol engine, and if we allow 1/2 lb. per h.p. to take care of the greater ratio of maximum to mean cylinder pressure which is inseparable from the higher compression ratio, we get the specified figure of 3½ lbs. as against 2 lbs. per h.p.

After discussing the difference between constant volume and constant pressure combustion, Mr. Pye says that in the high speed heavy oil engine there can be a continuous passage from one to the other by alteration of the instant when injection of the fuel begins. Constant pressure can be obtained by injecting just before dead centre, by advancing this point of injection practically constant volume combustion can be obtained with correspondingly higher maximum pressures.

The practice in this country has been to limit maximum pressures to 700-800 lbs. per sq. in. and for this an injection timing of 15-20 deg. before dead centre can be allowed with a compression ratio of 12:1. The Packard engine has constant volume combustion with maximum pressures of over 1,200 lbs. per sq. in. The injection timing is 45 deg. before dead centre and the compression ratio 16:1.

Fuel economy improves with approach to constant volume combustion. Mr. Pye says with regard to the reliability of the heavy oil engine that the ratio of maximum to mean pressure is at best 7 or 8 and whether this can be profitably increased as in the Packard engine to 14 or 15 can only be decided by experience as reliability may require higher weights per h.p. for such high maximum pressures.

Three methods may be used for the proper mixing of the fuel and air. The first is the direct penetration of the fuel jet throughout the combustion space in an adequately pulverised condition. The second is using a cylinder which has a small pre-combustion chamber into which the fuel is injected in a partially atomised condition and from which a mixture of burning and unburnt fuel is projected violently into the remainder of the combustion space through a number of small holes. The third method is to ensure an organised air swirl in the cylinder which will bring all the air into association with the fuel. The fuel in this case need not be fully distributed or very finely divided.

This system is used by Mr. Ricardo in his sleeve-valve engines. The air is admitted tangentially to the cylinder and this swirling motion is accelerated when all the air is forced into a combustion space of about half the diameter of the cylinder. The fuel is projected axially near the circumference of this combustion space and during about 35 deg. of crank revolution the air makes a complete circuit of the combustion chamber. Experiments have shown that a rate of air swirl about ten times that of the r.p.m. of the crank gives the most satisfactory engine performance and that about 75 per cent. of the oxygen present can be burnt in an efficient manner.

According to Mr. Ricardo the combustion process may be divided into three stages while injection of the fuel proceeds. There is the delay period, a period of very rapid combustion and the third period during which the fuel burns as it enters the combustion chamber. The rate of burning during this period can be controlled to some extent by the rate of fuel injection.

### RESEARCH WORK WITH SINGLE CYLINDERS.

The Royal Aircraft Establishment at Farnborough first showed that a combination of piston speed and m.e.p. within 20 per cent. of the best petrol engines could be obtained with a heavy oil engine. This engine had a large cylinder with bore and stroke of 8 by 11 in. At the maximum of 1,200 r.p.m. the mean piston speed was 2,200 ft. per min.

The results of this research work were the Beardmore engines in the R.101. These had a bore and stroke of 8 1/4 by 12 in. and were designed for a slightly slower speed. As in the Farnborough engine the mixing and burning of the fuel and air is by directed fuel spray from a central injection valve. No attempt is made to provide organised air movement in the cylinder. Mr. Pye then outlines the advantages that are offered by the jerk-pump as used by the Beardmore engine over the mechanically operated valve used in the Farnborough experiments.

Referring to the type of engine which has a pre-combustion chamber, Mr. Pye says that research work upon this type has been more extensive in the United States than here, where results have not been encouraging. He says that this system may have certain advantages from the point of view of ease of starting and of control, but it cannot be regarded as more than a temporary expedient in the production of heavy oil engines of high efficiency.

The development of cylinders with an organised air swirl is due to Mr. Ricardo in the work which he has been doing for the Air Ministry in recent years. Two single-cylinder research engines have been used of the same bore and stroke—5 1/2 by 7 in. The first was designed for a speed of 1,300 r.p.m. and the second after experience with the first for speeds up to 2,200 r.p.m.

The maximum h.p. of the first unit is 32.5 at 1,300 r.p.m. which corresponds to a b.m.e.p. of 119 lbs. per sq. in. and at this output the fuel consumption is .42 lb. per b.h.p. hour. For a range of b.m.e.p. from 70 to 100 lbs. per sq. in. the fuel consumption is only .355 lb. per b.h.p. hour. Although the high speed engine cannot compete with these fuel consumptions on a b.h.p. basis, on a basis of indicated power there is little to choose under optimum conditions. One may conclude therefore that combustion is equally satisfactory at the high speed.

The output from the high speed cylinder is almost on a par with petrol engine practice, and having regard to the saving of 25 per cent. of the fuel weight, should provide the basis for a heavy oil engine well able to compete with its petrol rival, for the mean piston speed at 2,200 r.p.m. is 2,570 ft. per min. and the engine can develop a b.m.e.p. of 110 lbs. per sq. in. at this speed.

*(To be continued.)*

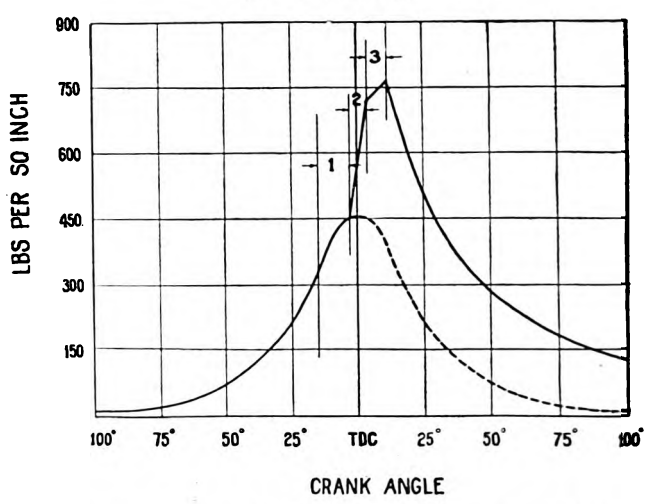


**DIAGRAM SHOWING THREE PHASES OF COMBUSTION PROCESS IN COMPRESSION IGNITION ENGINE**

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# MODERN AIRCRAFT

## "THE WORLD'S FASTEST FIGHTERS"

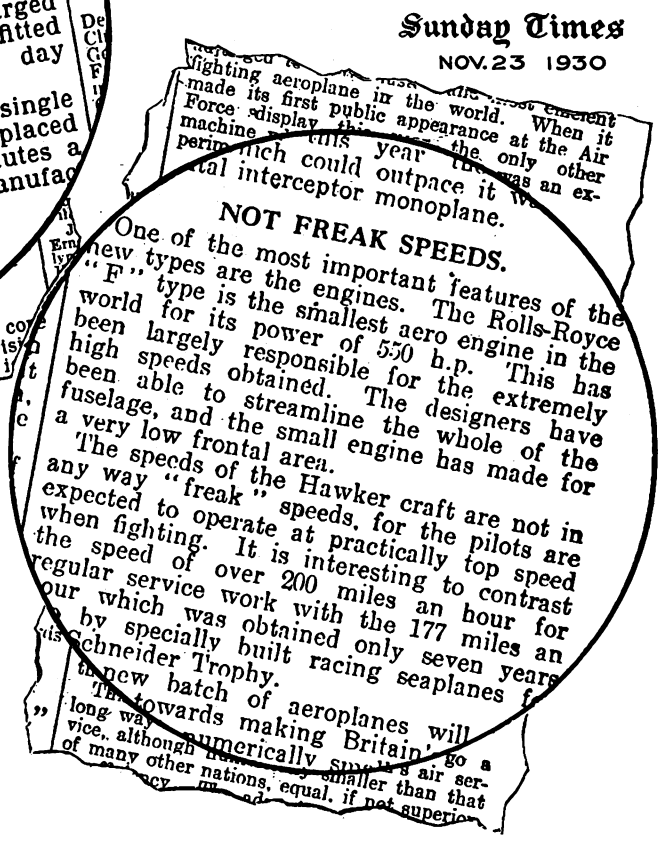
BELGIUM BUYS BRITISH AEROPLANES

A full "groupe," comprising three fighter squadrons of the Belgian Air Force, is to be provided with British aircraft, an order for 45 Fairey "Firefly" single-seater fighters having been signed by the Belgian Government.

The machines have the supercharged Rolls-Royce F engines that are being fitted in the latest R.A.F. fighters and day bombers.

This is believed to be the largest single order for British fighting machines placed by a foreign Power, and it constitutes a triumph for British design and manufacture.

'Morning Post' NOV. 22 1930



Sunday Times NOV. 23 1930

NOT FREAK SPEEDS.

One of the most important features of the new types are the engines. The Rolls-Royce "F" type is the smallest aero engine in the world for its power of 550 h.p. This has been largely responsible for the extremely high speeds obtained. The designers have been able to streamline the whole of the fuselage, and the small engine has made for a very low frontal area.

The speeds of the Hawker craft are not in any way "freak" speeds, for the pilots are expected to operate at practically top speed when fighting. It is interesting to contrast the speed of over 200 miles an hour for regular service work with the 177 miles an hour which was obtained only seven years by specially built racing seaplanes for the Schneider Trophy.

# ROLLS-ROYCE

## AERO-ENGINES

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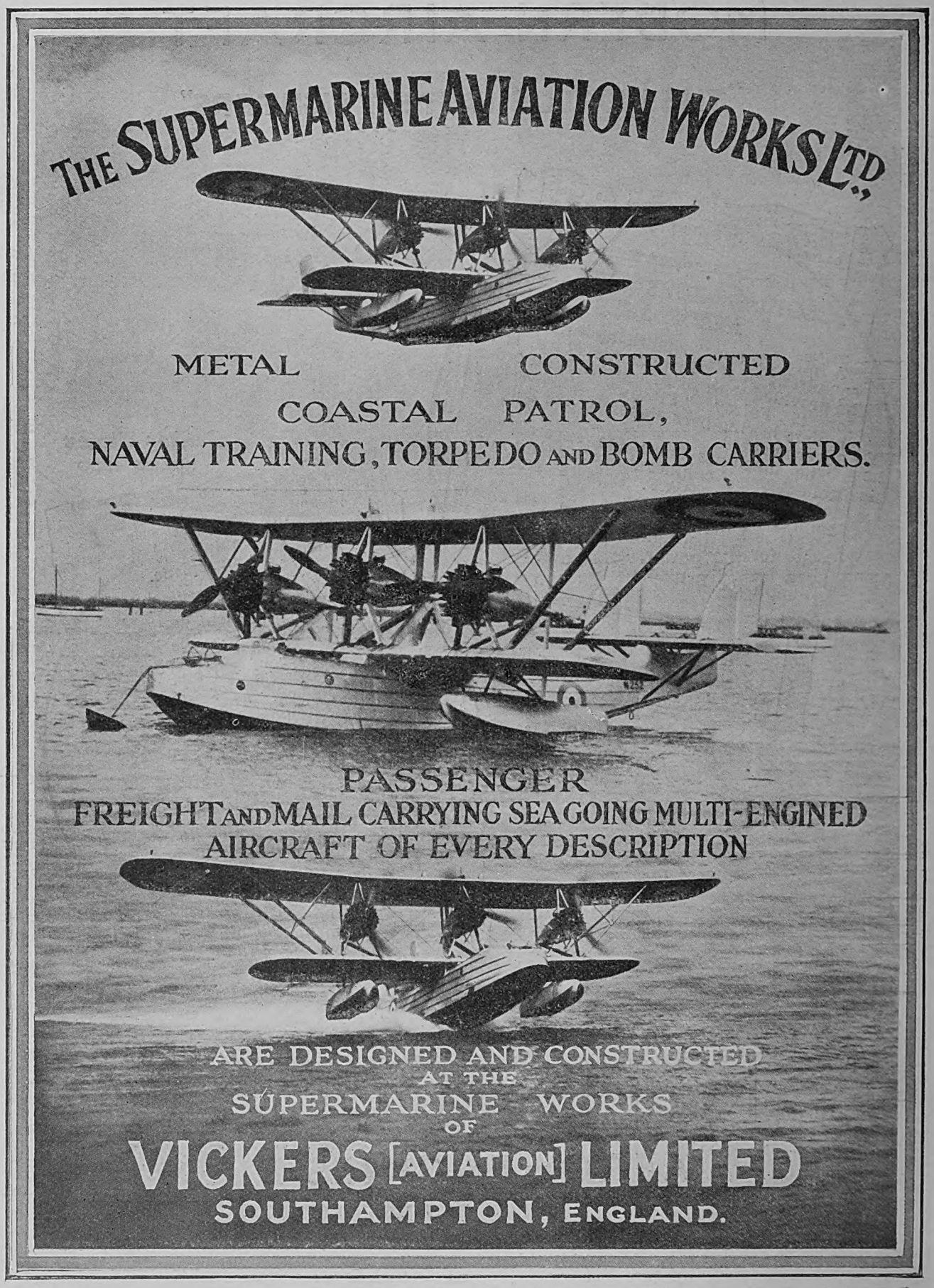




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# THE LIGHT AEROPLANE
## AND THE FLYING CLUBS.

### THE FLESHPOTS OF HAMBLE.

The Hampshire Aeroplane Club entertains as well as it flies, so the fifth annual dinner of that talented and most cheery organization was foredoomed to success. Actually the function quite transcended all reasonable expectations. Both the Club and its guests were fortunate in the presence of their distinguished President, Lieutenant-Commander Lord Louis Mountbatten, K.C.V.O., R.N., who took the chair after three years' absence on service abroad.

Gatherings of aeronautical people are probably a degree or two worse than any others to marshal according to a programme. As the lobby of the South Western Hotel filled up with the members and their many visitors the crowd quickly congealed into molecules of great chemical stability. They only broke up to reform into others which radiated technical gossip and were herded, with difficulty and still arguing, by an efficient master of ceremonies into the reception hall.

Lord Louis and Lady Mountbatten received the guests, of whom there were about 180.

The quality and conduct of the dinner itself was the foundation of our opening statement, and conviction grew as the evening went on.

After the toast to the King had been honoured the REV. E. G. D. FAWKES, M.A., was called on to propose the Club. The Hampshire Club is fortunate in its wealth of reverend, learned and sporting members, because the REV. E. BRUCE CORNFORD, M.A. responded to the toast.

Mr. Fawkes referred briefly to the standing and achievements of the Hampshire Aeroplane Club, its large membership and its five aeroplanes. Most of the credit of conquering the psychological handicap of being situated between two cemeteries, a hospital and the deep blue sea, was due, he said, to that very full-throttle person, the Secretary, Mr. F. J. Harrington.

Mr. Cornford's reply was definitely among the best utterances of the evening, full of breezy commonsense but considerate withal. He first expressed the deep sense of loss which everybody felt at the absence of Sir Sefton Brancker, whose genial presence at all their previous dinners had been as pleasing as it was now keenly missed. He expressed the pleasure of the members at seeing their President in the Chair, particularly as he had taken his A licence in May; he deplored the slackness of the laity in entrusting the toast to one clergyman and the reply to a Victorian relic. He reminded us that the Club had 400 members.

Mr. Cornford's further comments did not qualify him as an ancient monument. Several of the later speakers had noted the impending 27th anniversary of the first power-driven flight, by the Wright Brothers, but the reverend gentleman stole their thunder, and showed an almost unclerkly familiarity with aviation, its history and technique. He urged a greater sense of air values, contrasted the Army and Navy estimates with those for the Air Force, and deplored England's position as the fifth air power.

As a small but significant side-line Mr. Cornford spoke of air stamps, and the good effect which a collection of them would have on the youth of the land. Finally he enunciated the maxim: "Hats off to the past. Coats off for the future."

LT.-COL. L. A. STRANGE proposed the health of "British Aviation," and took the practical course of diagnosing its symptoms. He praised the engines, but suggested that the aeroplane designers had fallen down. They had not yet given us an aeroplane that could be flown away as a man drives a motor-car, and the essentials of safety had made little progress since the early days of the well-known Avro, once queen of the skies and still queen in the joy-riding field.

SIR ALLIOTT VERDON ROE replied briefly. He thanked Col. Strange for his compliments to the old Avro, but modesty forbade him, he said, to state where the one amphibian originated which could be found to take the Prince of Wales from Hendon Aerodrome and deposit him on Southampton Water.

HIS LORDSHIP, the Chairman, proposed the Guests. He regretted his absence from so many of the Club's functions, but he had been serving overseas. He remarked plaintively that the Rev. Mr. Bruce Cornford had forestalled him utterly with remarks on the 27th birthday of power flying, but sportingly endorsed all that speaker had said. He had checked the figures carefully and the reverend member had got them all right.

His Lordship said that the 16 leading commercial aircraft in the United States averaged 144 m.p.h. among their top speeds, and about 120 m.p.h. for cruising. In England we had none yet which could approach that. He then welcomed the guests, among whom were some, such as Sir Alliott Roe, who were real pioneers, and many who had served long and well in the cause of aviation.

THE RIGHT WORSHIPFUL THE MAYOR OF SOUTHAMPTON, COUNCILLOR E. W. CROSS, responded for the guests. He spoke of the negotiations now going on for a new municipal aerodrome near Swaythling, and expressed his hope for early aerial interchanges with the neighbouring seaport of Portsmouth. He also declared that the aviating fraternity did not advertise enough, a most admirable sentiment which gained nothing from his suggestions in facetious vein.

MR. R. A. N. SHUTTE moved a toast to the Chairman, whom he said had been President of the Hampshire Aeroplane Club since its inception. His Lordship had, perhaps judiciously, been abroad for a long time, so that careful questioning of the pilot-instructor and searching of the records had failed to produce anything to his aeronautical discredit.

THE PRESIDENT thanked the members and guests, and added to his previous remarks the statement that 67 people flew across the Atlantic before Charles Lindbergh did so. This seemed to surprise some of the guests, most of whom remembered Alcock and Brown, some of them knew of the N.C.4 but many seemed to have forgotten the R.34.

Dancing occupied the rest of the evening and part of the next morning. Torn between conflicting attractions the guests ceased not from talking between dances and long after the orchestra had gone home to well-deserved rest.—F. D. B.

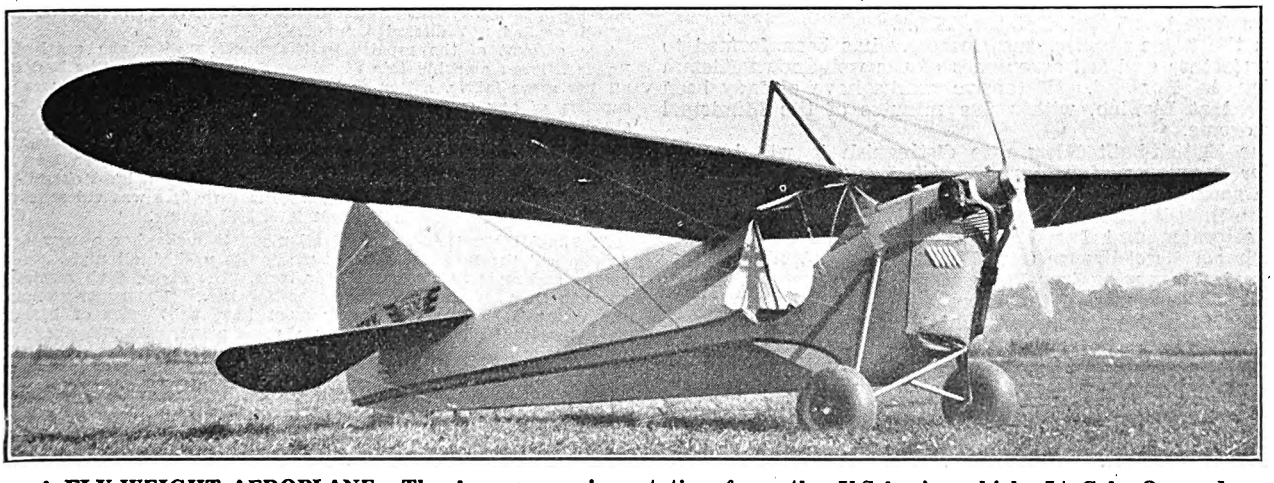
### AN AERONAUTICAL ADVENT.

The first public reports in this country of the Aeronca light aeroplane are unfortunately concerned with a detached cylinder-head and consequently forced landing, while the machine was being flown to the Aero Show in Paris.

The Aeronca is a really light aeroplane with a small two-cylinder horizontally-opposed air-cooled engine which has been specially designed for the machine. This develops 30 h.p. at 2,500 r.p.m. With this engine the Aeronca has demonstrated its ability to take-off from water on floats and also flies with two people. Its climb is quite effective, though the top speed is naturally less than that of aeroplanes still known as light though in effect they have more power than some of our scouts in the War 1914-18.

The Aeronca is a wire-braced high-wing monoplane with a marked dihedral angle. With all respect to all parties concerned, there is a resemblance between its wing structure and that of the aerial toboggans now so much in evidence. The pilot and passenger sit side-by-side beneath the wing. The air-cooled engine is exposed in the extreme nose above the markedly deep belly of the machine. This point is to be noted particularly as the engine is not so much at the nose of the fuselage as is usual, but is rather at the top of it.

The undercarriage is a simple affair, with an air-wheel on each side of the fuselage.



**A FLY-WEIGHT AEROPLANE.—The Aeronca, an importation from the U.S.A., in which Lt.-Col. Ormonde Darby and Mr. Dietz are interested. It resembles both the Wren and the Wee Bee of 1923-24.**

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## THE LONDON AEROPLANE CLUB.

The Annual Dinner and Dance of the London Aeroplane Club will be held at the Park Lane Hotel, Piccadilly, London, W.1, on Tuesday, Feb. 17, 1931, at 8 p.m., for 8.30 p.m.

The prices of the Tickets are: Single 18s. 6d. and Double (lady and gentleman) 32s. 6d. Exclusive of wines, but including a running [*i.e.*, liquid.—ED.] buffet till 2 a.m.

Tickets may be had from the London Aeroplane Club at Stag Lane Aerodrome, Edgware, or the Royal Aero Club, 3, Clifford Street, London, W.1.

Tables will be made up of parties of four, eight or ten, and Members wishing to make up their own parties should advise the Dance Secretary, Mr. M. P. S. Spencer, at London Aeroplane Club, Stag Lane Aerodrome, Edgware.

*The Committee hope that members will make a special effort to support the Dinner and Dance and bring guests.*

To facilitate the arrangements members are asked to make early application for tickets.

The draw for the Club Raffle of three aeroplanes will probably be made during the evening. Tickets at 10s. each, are still available.

Several members have expressed a wish to receive Ground Instruction, and, to meet these requests, the Club has decided to institute the following courses:—

(1) Two classes in Daily Maintenance, consisting of not more than six members, will be held daily, from 8 a.m. to 10 a.m. and from 5 p.m. to 6 p.m. The fees are £3 for one month payable in advance.

(2) A three months' course, comprising Daily Maintenance, Engines and Rigging. Daily attendance will be required and not more than four members will be allowed to take the course at the same time, two members on Engines and two on Rigging. The fees are £15 for the three months' course payable in advance.

The classes will begin on Feb. 1, 1931. Members wishing to avail themselves of these facilities are requested to apply direct to Mr. M. P. S. Spencer, Assistant Secretary, London Aeroplane Club, Stag Lane Aerodrome, Edgware.

## MISS SPOONER'S RETURN.

Miss Winifred Spooner and Mr. E. C. T. Edwards arrived in Rome on Dec. 13 from Naples after staying some days in Belmonte attending to their damaged Desoutter. They were met by Colonel Liotta of the Royal Aero Club, Prince Lancelotti, Captain Bradley, of the British Embassy, and some officers of the *Regia Aeronautica*.

With Major de Bernardi they visited Orbetello Aerodrome on Dec. 14 to thank General Balbo, Minister of Air for Italy, for his help to them after their fall into the sea. They also wished the General and his officers all good fortune on their impending formation flight to Brazil.

## KLEMM-HALL AEROPLANES.

A new and interesting firm, known as Klemm-Hall Aeroplanes Ltd., was registered as a Public Company on Dec. 8. The authorised capital is £50,000 divided into 170,000 Preferred Ordinary shares of 5s. each and 150,000 Deferred Shares of 1s. each.

The directors are David George Hall, J.P., Gwentland, Penarth (Chairman of the Hydrogen, Oxygen and Plant Co. Ltd.), Chairman. William Thomas Harvey, 20, Carlton Road, London, S.W. (Joint Managing Director of the Acetate Products Corporation Ltd.). And Brig.-Gen. A. Huggins, C.M.G., D.S.O., M.I.M.E., M.I.A.E. (formerly Director of Aircraft Equipment at the Air Ministry), 91, Lexham Gardens, London, W.8.

The solicitors are Herbert Smith and Co., and Secretaries and Registered Office are Ertia Trust Limited, 19, Adam Street, Adelphi, London, W.C.2.

As the name implies, the Company has been formed to manufacture and sell aeroplanes of the well-known Klemm design in England. Extensive works have already been secured at Ipswich, within five minutes of the Municipal Aerodrome.

The British-built Klemm to distinguish it will be sold under the name of "Klemm-Hall." Exclusive rights have been acquired for Great Britain and Ireland and the whole of the British Empire (except Canada), including all British Protectorates and Mandatory Territories. The Company also has a direct licence from Professor Hugo Junkers under the patent covering Low Wing Monoplane construction.

Notable successes of the Klemm in 1930 include winning for the third time (now outright) the Belgian King's Cup and Aero-Club Belge Cup; second and third in the *Challenge International de Tourisme*, second in the Grosvenor Cup Race and third in the Circuit of Italy Competition,—with being first in Practical Tests.

The remarkable World Record for light aeroplanes was recently gained by Mme. Maryse Bastié, when she remained in the air for 37 hours 28 minutes 37 seconds, was accomplished in a Klemm (Salmson engine).

Salmson and Cirrus engines will be adopted as standard, and other makes of engine fitted to order.

The intention of the firm is to preserve in the British-made Klemm all the main features which have proved themselves so well over years of severe flying, but the Klemm-Hall will have certain improvements, including folding wings, extra tankage giving a range of over 1,000 miles, and the internal equipment will be brought more into line with English standards of comfort and effect.

The initial members of the Board (which may be added to) are all well-known business men, and with General Huggins as Managing Director and with Mr. George Newman, who was for over twelve years Works Manager with S. E. Saunders Ltd. in charge of Production, the Company is evidently proceeding on the right lines under sound auspices.

The directors propose to make Heston Air Park the firm's London Headquarters for flying.

His many friends in the R.A.F. and out of it will be delighted to welcome General Huggins into the active ranks of Civil Aviation. In the R.A.F. he was acknowledged to be one of the most practical of senior officers. The fact that he was highly esteemed by General Trenchard, when he commanded the R.F.C. in the field, is testimony enough for most people to General Huggins' worth and ability. After leaving the R.A.F. he joined the Sunbeam Motor Co. Ltd., of Wolverhampton, and has done much good work for them. In every way General Huggins is an acquisition to the British Aircraft Industry. We hope to see the firm produce something much better than the original Klemm.

## MISS JOHNSON'S FLIGHT TO AUSTRALIA.

A lecture was given by Miss Amy Johnson, C.B.E., before the Women's Engineering Society at 41, Cadogan Square, on Dec. 9.

Miss Johnson said that although her lecture had been described in the printed notices as a description of her flight with "Jason," she was in fact going to give her audience an account of some of the technical aspects of the flight. She said that so much that was untrue about her flight had appeared in the newspapers that she could not begin to put things right in a lecture and would have to wait until she could publish a book. Miss Johnson then read out the full specification of the Gipsy I engine and described the modifications that were made to the machine for the trip. She explained that "Jason" (a D.H. Gipsy-Moth) was originally built at the same time as the Moth in which Capt. MacDonald attempted to fly the Atlantic, and that, if anything had gone wrong with Capt. MacDonald's machine he was to have "Jason." "Jason" was then sold to Capt. Hope and it had flown 26,000 miles before she had it.

Miss Johnson said that she considered that the success of her flight was due to the training she had received in the workshops at the London Aeroplane Club where she had learned to do all necessary minor repairs to her engine. She generously acknowledged, however, the help that she received at various stopping places on her route, in three of which she said that mechanics had worked all night on her machine.

Miss Johnson's lecture grew less technical as she recounted her progress and her descriptions of her adventures and difficulties at the various stopping places were very entertaining. Her claims that all previous flights to Australia had been made by the Egypt route is not quite accurate because one notable flight, that of Sir Alan Cobham in a D.H.50 in 1926, was over practically the same route as that of Miss Johnson. As the flight progressed her mechanical difficulties increased principally because of mistakes which had been made by willing but unskilled assistants at the various aerodromes. The thread of a petrol cap broke, the cowling pin had to be hammered in and hammered out again and the spare airscrew had to be removed every time she wanted to get at the engine. She suffered very much from headaches and whenever she left the machine for half an hour some kind person had filled it up with the wrong kind of oil or had not filtered the petrol.

The account of the repairs to the machine after she crashed at Rangoon is an amazing tale of triumph over difficulty. She had used all her spare fabric, cotton and dope at Baghdad and there were no supplies of any sort at Rangoon. Eventually the broken ribs were glued together and copied in the workshops of the Forestry Department, the fabric was pieces of shirts made from surplus aeroplane fabric soon after the War by the wives of Englishmen in Rangoon (and never worn). And the dope was made up by a local chemist by matching the smell of the old dope. The torn tyre was vulcanised in a local garage so successfully that it is still in use.

At Hinaidi the R.A.F. worked all night to make her a new strut. At Karachi the Imperial Airways mechanics worked all night on her engine and replaced all her missing tools. The Flying Club mechanics at Dum Dum overhauled the engine for her. (The super-women of the Women's Engineering Society must have wept tears of blood to hear how much help she got from mere men!) At Singapore the R.A.F. took charge of her machine, overhauled the engine and fitted a new wing.

Miss Johnson described her crash at Brisbane as being due to carburation trouble and said that the same thing had happened to Capt. Matthews when he got to Australia. She said that the reason was that ordinary motor spirit was used in aeroplanes in Australia and that her carburettor had not been adjusted to suit it.

Miss Johnson's lecture was very warmly received.—C. M. MCA.

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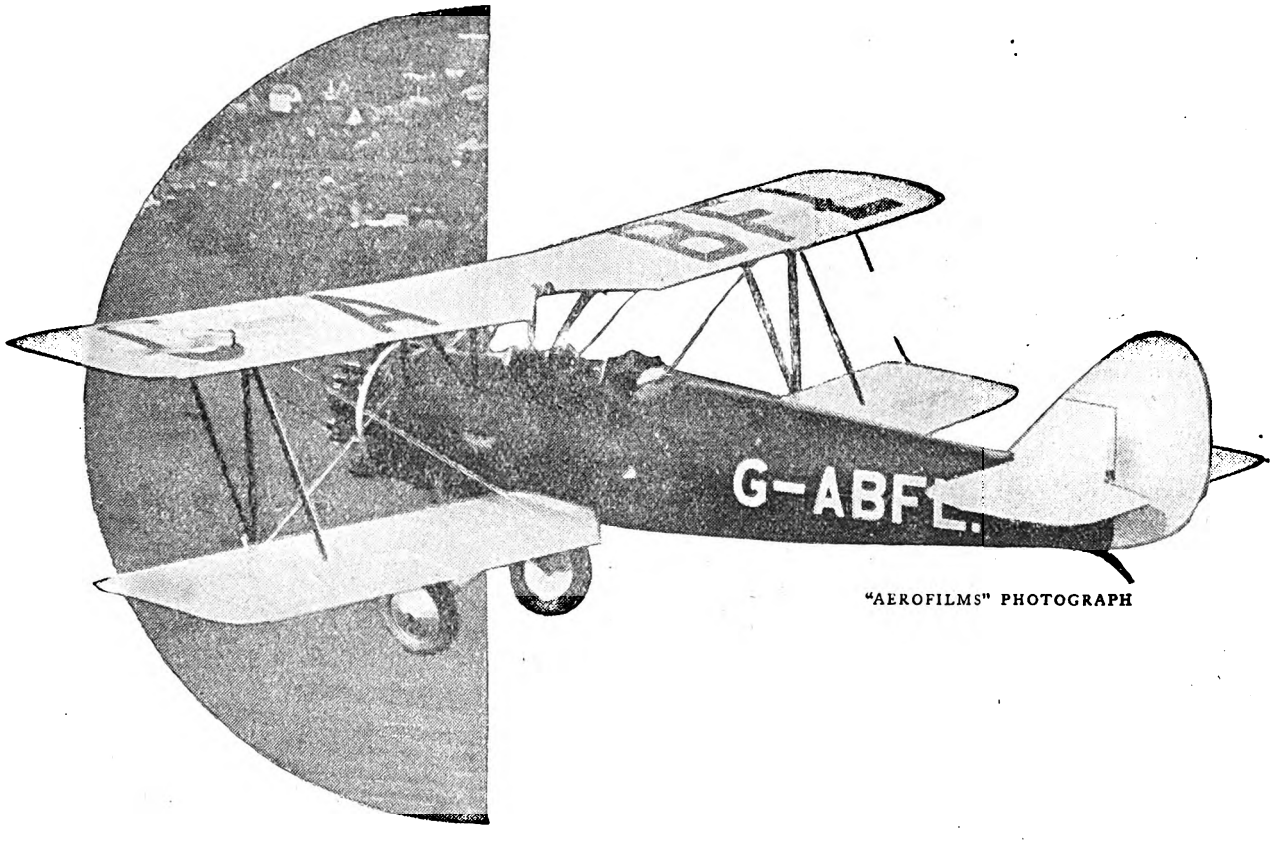
# A TRAINING MACHINE that only AVRO could have built




"AEROFILMS" PHOTOGRAPH

For thirteen years—ever since the famous Avro 504K was adopted for the training of British pilots — Avro have been concentrating on the building of better aircraft for training purposes. All this experience has gone into the new Avro Trainer Type 621, which is a training machine such as only Avro know how to build.

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# TRADE NEWS

## AN HISTORICAL NIGHT'S ENTERTAINMENT.

The annual Works Dinner of the De Havilland Aircraft Co. Ltd. was held at the Portman Rooms on Dec. 12. Mr. A. S. BUTLER, Chairman of the Directors of the Company, was in the Chair, and over four hundred members of the Company attended the Dinner. After the Toast of His Majesty the King had been proposed by the Chairman and honoured by the assembled company, Mr. J. GOBY, head of the Gipsy Engine Shop proposed the toast of the Directors and Management. Mr. Goby said that the Staff owed a great debt of gratitude to the Directors and Management because they had dealt with the general depression which existed all over the country without wholesale dismissals. Speaking of production he said that their Firm was like Oliver, always asking for more, except that Oliver could only ask. The Moth had reached a high pinnacle of fame of which everybody was justly proud.

Replying to the Toast Mr. A. S BUTLER, who spoke without the microphone and whose voice could be heard all over the hall, said that he had very nearly missed this Dinner because on his way home from Canada he had been delayed by engine failure in mid-Atlantic (loud cries of "Not a Gipsy"). He had found that Moths were nearly as plentiful in Canada and America as in this country and the machine was earning high praise from all those who were operating it. The past year had been a momentous one in the history of the Company. It had seen the Puss-Moth, the Gipsy I and the Gipsy II in production but the trade depression had made selling no easy task. The Puss-Moth had given a new outlook to flying. The recent record flights made by Mr. Caspareuthus and Captain Barnard were evidence that this type marked another milestone on the road of D.H. successes. The Gipsy engine had added to its laurels not only in the Moth but in other machines as well. (Cheers). Mr. Butler then read out a list of successful flights achieved by the Firm's products during the past year all of which are well known to readers of THE AEROPLANE. Each achievement was greeted with rapturous applause by the audience. Mr. Butler went on to say that the increase of the Firm's activities had resulted in the removal of the Flying School to the new aerodrome at Hatfield where the flying training programme would be expanded in the spring. A new Branch had been opened in South Africa during the year. He then read messages of goodwill which had been received on the occasion of the Annual Dinner from their Branches in Canada, Australia, India and South Africa. He said that a representative had been sent to study the markets of South America and that steps were being taken for the Company to be prominently represented at the forthcoming International Exhibition at Buenos Aires.

Proposing the Toast of the Works and Staff, CAPT. G. DE HAVILLAND, O.B.E., in a short speech expressed the gratitude of the Directors and Management for the good work of all concerned in the success of the Company's products.

MR. F. T. HEARLE, General Manager, supporting the Toast, recalled the early days of the De Havilland aeroplane. He described the first aeroplane made by Capt. de Havilland with the assistance of the speaker, its construction and its first flight which had ended disastrously, happily without serious damage to Capt. de Havilland, its pilot. He also described their second attempt, a photograph of which in flight appeared on the back of the menu card of the Dinner, a machine which was eventually sold to the Balloon Section, Royal Engineers, the forerunner of the British Flying Services.

MR. A. V. FAURE, Head of the Drawing Office, replying, said that the confidence of the Directors and Management in the Staff was not misplaced. The Staff would continue to give the Company their fullest support.

Proposing the Toast of the Guests, MR. W. E. NIXON, said that the Guests included representatives of the Aircraft Inspection Department, of the Selling Agents, of the Insurance Group and of the Press. He made tactfully flattering comments on them all.

Replying for the Guests CAPT. A. G. LAMPLUGH of the British Aviation Insurance Group said that there was no civilised country that did not use the Moth. MR. GILMORE, of the A.I.D., supporting the Reply, said that speaking as a private individual and not as a member of a Government Department he must congratulate De Havillands on deciding to do without the Air Ministry and find orders for themselves. He then called upon the Guests to drink to the health and prosperity of the Company, a call which was received with enthusiasm.

The speeches were interspersed with a light musical programme contributed by members of the Staff of the Company and mightily enjoyed by the audience. The Dinner was organised by Capt. A. T. Eadon, who is to be congratulated on a most successful and enjoyable evening.—C. M. MCA.

## THE FAIREY CLUB DINNER.

On Dec. 5 the Fairey Aviation Company Social and Athletic Club held their eleventh annual dinner and concert in the canteen hall. Mr. C. R. Fairey, M.B.E., President of the Club, was in the chair.

After the first toast had been honoured the President proposed "The Club." He apologised on behalf of Mrs. Fairey for her enforced absence, and read a telegram of regrets from her. He referred to the history of the Club for the fourteen years of its existence, and said that their little industry was holding its own in its ability to make an article whereby British craftsmen could compete with the rest of the World, and this was gratifying in a time when the country as a whole was suffering from depression.

Mr. Owers, the founder of the Club, replied suitably, and paid compliments to certain of the members who had worked hard to make the evening a success. Mr. Ayers proposed a toast to the President, and donor of the many prizes which were afterwards presented. Mrs. Needell performed this office in the absence of Mrs. Fairey, and distributed awards for a large variety of outdoor and indoor sports.

The presentation was followed by a musical programme and by a very clever and sensational presentation of flowers to Mrs. Needell which featured an aerial battle among suspended models.

## A HERMES FOR PUNISHMENT.

The Hermes II engine joined a very exclusive company when it emerged unscathed and still going strong from the 100-hour full-throttle type test. So far as we know the Jupiter X is the only other engine which has succeeded in passing this severe trial.

As a result the permissible full-throttle revs. have been raised to 2,200 and the cruising revs to 2,000. Incidentally we know several Hermes users who declare that they have been in the habit of cruising at 1,950 in spite of the ticket. The full test consisted of 100 hours at 2,000, ten hours at 2,200 and one hour at 2,350.

The modifications which have made this added performance safe have been incorporated gradually, and are such that the Hermes I can be changed by the replacement of certain parts. These include the pistons, which are now full cylindrical instead of the slipper type; the camshaft, of which the cams are now of more gradual profile, different exhaust-valves, shrouded exhaust valve guides, and new cylinders.

**FAMILY APPRECIATION.—Lieut. Sarmento Pimentel, his wife and their six children; also the Puss-Moth in which he and Capt. Moreira Cardoso flew from Lisbon to Goa, Portuguese India, last November. Mr. Alan Butler made reference to this flight at the De Havilland Dinner.**

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The cylinders are now machined so that the edges of the cooling fins are no longer as cast. The small loss of cooling area is made up by the extra efficiency of the fins and the expected improvement in cooling has resulted.

Instead of copper and asbestos washers for the cylinder heads solid copper is now used. The carburettor now used is the Claudel Hobson D.48.

A very small hole from the oil channel in the crankshaft opens at the end of every crank web, and provides a splash escape under pressure which distributes to the cylinders centrifugally.

### AN OUTSTANDING VALVE STEEL.

The exhaust valve is probably the most hardly used component of the internal combustion engine. One does not often realise this as so many reputable engine builders use a steel which does its job and does it well without drawing attention to its presence, such a steel is K.E. 965 which is an Austenitic nickel-chrome steel which has been developed by Kayser, Ellison and Co. Ltd., Carlisle Works, Sheffield.

Some facts and figures of technical interest about this steel were given in Aeronautical Engineering, the technical supplement to THE AEROPLANE, of Nov. 26, 1930. A graph illustrated the high tensile strength of this steel at high temperatures; actually at 900 deg. Cent. the tensile strength of K.E.965 is 17.2 tons per sq. in. which the manufacturers state to be a much higher strength at that particular temperature than any other valve steel that is manufactured.

### SPECIAL MISSIONS.

The ingenious variety of names with which commercial aircraft are blessed by their makers, such as sports, touring, taxi or training machines, rarely signify any serious modification for their purposes. Generally they are charmingly versatile, which is all very well in its way but must sooner or later give way to the very specialised product.

Signs are already visible of the tendency. In the shops of the Desoutter Aircraft Company Ltd., are two machines nearly ready for delivery. One of them has a folding table for writing or tea, and is going to the Rollason Aviation Company Ltd. The other is being furnished with an extra 40-gallon fuel tank, not for a special long-distance flight but for long non-stop runs in the ordinary way of business. This machine is owned by Personal Flying Services, Ltd.

Both modifications are small matters enough, but they show which way the wind is going to blow.

### THE IRVING AVERAGE.

Figures recently compiled by the Irving Air Chute Company indicate that two lives are saved for every one hundred chutes which are put in service. Up to this time, during a period of about eleven years, about twenty thousand parachutes have been made and placed in service by the Irving Air Chute Company and its subsidiaries both at home and abroad.

In its records of the Caterpillar Club it has definite information at present to the effect that at least three hundred and sixty persons have been saved by parachutes. Several of these persons have been saved more than once. It is also known that there are some persons whose lives have been saved whose emergency jumps have never been reported to the manufacturers of the chute. It is becoming so common that people often take this life-saving use of the chute as matter of course and do not take the trouble to report it despite the fact that the Irving management is eager to enroll every person who makes an emergency jump in the Caterpillar Club. All such persons receive insignia in the form of a gold caterpillar pin.

About twenty thousand parachutes have been made by this company, but not all of those are still in service. The normal life of the parachute is about five years. It will easily last that long and will bring its wearer down safely in an emergency jump if it is properly packed and maintained during that time. In fact some chutes much older than that have saved lives. Undoubtedly some parachutes are never opened except in an emergency jump. On the other hand there is record of one chute which has saved the lives of three different persons.

### MANY INVENTIONS.

There has been a great deal of fine, confused reading in the Press about the accident to Miss Spooner and Mr. Edwards, but the truth is probably as indicated in last week's AEROPLANE, when the commonsense theory was preferred that the machine most likely hit the water at a time when the occupants thought they still had plenty of height, and that this took place in weather which that pioneer Meteorologist, Mr. James Pigg, would have referred to as "Hellish dark and smells of cheese."

*The Daily Mirror*, however, had a more sensational story which was definitely stated in that paper to be Miss Spooner's own narrative, as told in Rome. Her (alleged) own words were quoted as follows:—

> I had stood up to secure some wires when a sudden gust of wind blew me out of the machine and I fell 240 feet. When I came up in the water, I looked in vain for the aeroplane. Then, guided by lights, I swam for two and a half hours towards the shore.

Now, either Miss Spooner did or did not make use of the foregoing words, but they certainly smack more strongly of the fledgling reporter than of Miss Spooner, or any other normal, intelligent human being. If one had to guess, one would be pretty certain that the person who wrote those words and attributed them to Miss Spooner was a reporter who had seen "Hell's Angels," and then supped off meat too strong for a decadent digestion (lobster to wit), and that he had written them in his sleep while under the influence of the sort of nightmare such creatures suffer.

First of all, it would be interesting to know what wires could possibly need securing in a cabin machine, and, secondly, how anyone could be blown out of a cabin by a gust of wind, even if standing up. It all sounds remarkably like slipshod reporting by some lad who supposes that in times of stress there is always a collection of loose wires that have to be secured in an aeroplane, and who assumed, without bothering to find out, that the machine was one with open cockpits, out of which anyone might possibly (though improbably) be blown.

If some reporter has had the incredible impertinence to put words into Miss Spooner's mouth which she never spoke, all we can say is that there are soi-disant live wires about the place who ought to be secured, and it is a pity the old-fashioned method of securing such persons by the ears to the pillory at Charing Cross has gone out of fashion.

There is, moreover, little likelihood that anyone would survive an involuntary dive of 240 feet, and more unlikely still that anyone could swim for two and a-half hours after-

**EDUCATING DONCASTER.—The photograph shows the depot of E. W. Jackson and Son, French Gate, Doncaster, in which an Avro Avian (Cirrus Hermes) has been on show recently. While it was on view between 12,000 and 14,000 people passed through the show-rooms to inspect the machine. The display was of particular interest because Doncaster proposes to have an Air Park of its own. Plans for it have been prepared by Sir Alan Cobham and the local papers are quite enthusiastic. E. W. Jackson and Son, Ltd. have recently been appointed Cirrus Service Depot for Doncaster and a 50-mile radius around, and stocks of Cirrus spares will be available there.**

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# DUNLOP

## AEROPLANE TYRES and WHEELS

The Dunlop range of Wheel and Tyre equipment offers designers and Operators the widest selection to meet the varying conditions for which they have to cater.

*The range includes:*

(a) High Pressure Tyres, wired type on well base rims.
(b) Wheel-less low Pressure Tyres, hub mounted.
(c) Low Pressure Tyres, intermediate type, small diameter wheels.

HIGH PRESSURE EQUIPMENT.
WIRED TYPE ON WELL BASE RIMS.

The value of wired type equipment for Aircraft requirements has been fully proved by experience. Dunlop aircraft types provide maximum safety of attachment under any landing conditions. The range of High Pressure equipment includes Tyres of all standard dimensions. To meet the requirements of reduced weight, increased strength, improved stream lining, the Dunlop patent Light Alloy Disc Wheel has proved unequalled. This type of wheel is designed with special regard to the fitment of brakes, but is also available without brake drums.

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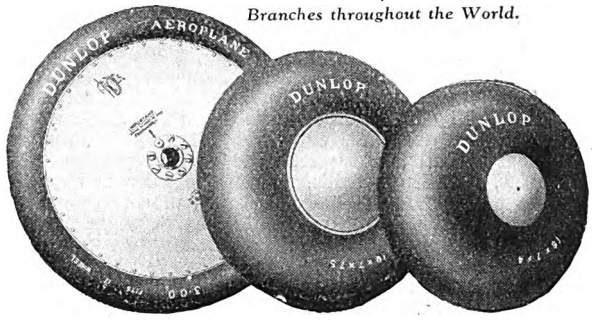


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wards. If Miss Spooner spoke no such words as those definitely put into her mouth by *The Mirror* there will be interest in watching for the number of *The Daily Mirror* which will be devoted to humble apologies for one of the worst lapses of taste known to modern times. If all these things happened exactly as stated in *The Mirror*, why, then, the mirror of truth remains untarnished, and all is well.

Incidentally, the fact appears to be established that whatever caused the trouble, it was neither engine nor machine failure.

Imperial Airways are finding an increased demand for space on the India Mail machines for perishable goods of a sort not easily obtainable in hot climates, and recently a clutch (or covey) of live lobsters was sent to Egypt.

Another rare and exotic fruit in great demand out there is the brussels sprout, and so precious is this singular excrescence of the cabbage stalk thought to be in Egypt that at Shepheards Hotel, Cairo, they substitute one of these lively little strangers for the more conventional boar's head at Yuletide, bringing it in processionally on a huge charger with a lemon thrust between its jaws and a bit of holly on its brow, but before doing so they surround it with a gallon of gin, which they set alight.

All the waiters then cry "Noel, Noel!" whilst the chef, slightly overcome by the fumes, and with his moustachios burnt off, joins in gruffly basso profundo, with "Ohell! Ohell!" All is then smiling goodfellowship and kisses under the mistletoe (also imported by Imperial Airways Ltd.), and a cut off the breast of the sprout costs twenty-nine-and-sixpence.

There is, however, another side to the activities of the Air Lines, one, alas! less innocent and more sinister. Only the other day some ten thousand homes were potentially wrecked by the introduction by air to Paris of a complete miniature golf set, complete with all manner of horrid hazards and hobstacles. The bucolic plague is spread, we know, by rats in ships, and the cholera is supposed to get about the World carried by choleric Colonels on their travels, but precautions similar to those in force regarding foot-and-mouth disease, should really be taken to prevent the spread of this new dread scourge to countries hitherto immune from any disease more deadly than ping-pong, or put-and-take.

Considerable excitement has been aroused in Aircraft Manufacturing Circles, it is rumoured, by the decision of one Manufacturer to sell his forty-seater aircraft (if asked) to Firms which give presents away in exchange for coupons.

Our Mr. Bifford Barman provides the following extract from the aeronautical lexicon:—

*Aerodynamics*—An arcane science dealing largely with the effect of the vacuum on top planes of aeroplanes and the mysterious pull of gravity on lower ones. The scientific principle whereby gents' dentures, upper and lower, retain their allotted place in the scheme of things was first applied to aeroplane wings by Prof. Splorge, a dental surgeon, who may thus be called the father of aerodynamics. The Professor was done to death on Tower Hill by the S.B.A.C. in 1888 for heresy, and refusing to fall flat on his face when that Learned Society passed him in solemn procession on the way to its Annual Turkish Bath.

*Aerofoil*—Art of foiling any shifty-eyed gent supposed to belong to an Aero Club, who endeavours to cash a cheque by fair words or force. Also, Section of high lift wing, said to be of all-metal construction, but really made of chocolate covered with tinfoil.

*Aeroplane*—The best aeronautical journal in the World. The name was also used for early heavier-than-air machines and has been used to describe all manner of absurdities since. The Editor of The Aeroplane had the name first, and should have entered it at Stationers Hall, when all aircraft would have had to go by the name "Kite," Crate, Ship, or something equally unpleasant,—or as an alternative bear the words *Aeroplane Copyright*.—SPRY.

### E. & O. E.

Now that the special British Aircraft Number of The Aeroplane has been received and admired, and the dust of acclamation has subsided sufficiently to see, we find that certain facts were not stated as clearly as we should have liked. For instance, no account was taken of the Desoutter Mark II's ability to fly with a maximum permissible load of 2,000 lbs. After all the extra 100 lbs. is important when it means taking away the extra golfing equipment and other sartorial delights without which no week-end is really complete.

The climb of the Gloster Survey machine was given as 700 ft. per min. Here the error, which was a clerical one at the point of origin, was patent to all intelligent persons so there hardly seems any necessity to explain that this should have read 1,700 ft. per min.

A picture of a Cirrus Mk. III was described as an *upright* Cirrus Hermes, here again the *cognoscenti* knew it was not, and anyway a rose does smell as sweet by any other name. Even more obviously incorrect was the statement that the Cirrus Hermes Mk II develops 105 h.p. at 1,000 r.p.m. Everybody knows that this engine has achieved real fame by running at 2,000 r.p.m. for 100 hours and at these r.p.m. the power developed is 110; 105 h.p. is developed at 1,900 r.p.m.

### IN THE CITY.

By G. P. Kerr.

[These notes have appeared once in every Stock Exchange account and are intended to be of interest to those who hold, or intend to hold, investments in companies concerned directly or indirectly with aviation. But as the Aircraft Share Market is so small they will be suspended in the New Year until there is greater activity, and the space occupied by them is likely to interest a larger number of our readers. —Ed.]

| | | |
|---|---|---|
| Contango days .. | .. Dec. 15 .. | Jan. 5. |
| Account days .. | .. Dec. 18 .. | Jan. 8 |

The last account of the year closes under the shadow of American bank failures and another American stock market crash. Inevitably, some repercussion was felt on the London Stock Exchange, and prices throughout the list are again lower on the fortnight. Compared, however, with other semi-speculative securities the aviation share group has survived remarkably well.

Over the past twelve months holders of most British aviation shares have, of course, on balance lost money,—on paper. But more has been lost in other ordinary industrials and holders of aviation shares in America have had a still more unhappy time.

"Put me, *if you must*," said a much-travelled American business man to a stockbroker the other day, "into British aircraft and British aircraft shares. None are safe—but yours are safer than ours!!"

Fairey Aviation Ltd. cater primarily for Government departments, and unless the 10/- shares were bought in the height of the boom and of American demand their capital value is more or less intact. It is true that the shares fluctuated in 1929 between 23/6 and 11/3, but the highest price reached during the current year was 16/3 and the lowest 9/6. The present price is about 12/6, which includes a dividend of 7% free of tax to be paid early in January. Last year the dividend was 7% less tax, so that in effect shareholders are receiving the equivalent of 9% gross.

The full figures make interesting reading. Net profit amounted to £169,164—an increase of £5,010 on the previous year's results. At the meeting last year the chairman stated "that it was the company's policy to conserve funds and strengthen the position against the time when the aviation market widens in other directions." This policy is being continued.—£30,000 of the year's profits are allotted to general reserve and £40,000 applied to writing down designs and similar items.

The satisfactory nature of the report draws attention to the attractiveness of the 8% first mortgage debentures, which received favourable comment in my notes of Oct. 22. The price was then £100—it is now £104. The debentures are a well-secured and most satisfactory high-yielding short-termed investment. Interest is payable March and September and the whole are redeemable at 105 at latest June 30, 1940.

Holders of other aviation shares have not been so for-

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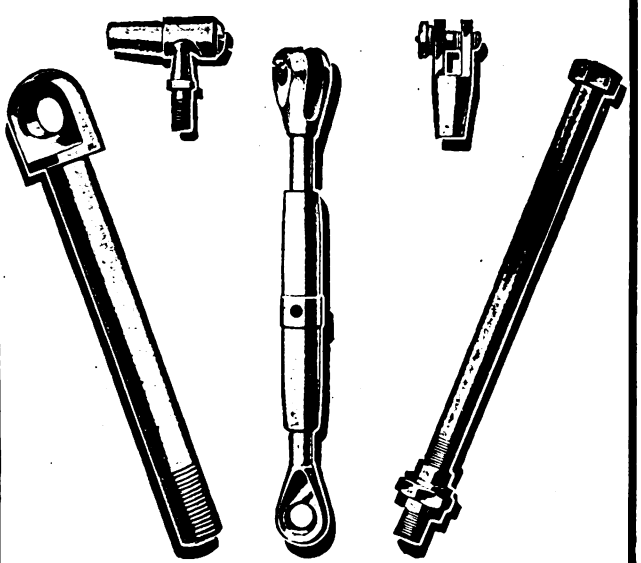

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tunate. No dividend was paid on National Flying Services, and Imperial Airways reduced their distribution from 7½% to 5%. The capital value of the £1 Ordinary shares has fallen from a high level this year of 30/6 to the present price of 18/3, a drop of about 40%. Handley Page, which closed the account unchanged at 10/-, were as high as 16/- earlier this year.

The fluctuations in the price of De Havilland £1 Ordinary shares over the past twelve months have provided ample opportunity for the short term speculator. The financial pilot who virtually controls the market has kept the altimeter reading somewhere between 27/- and 34/-. It has always been "right" to sell De Havillands over 31/3 and buy them back at 28/9.

In my last notes I promised to discuss the dividend prospects of these shares, which I suggested were overvalued at 30/-. They are now 27/6. Unless an aircraft company has been producing for Government contracts it must have been exceedingly difficult to escape from the effects of a year of almost universal depression. In the chairman's speech nearly a year ago three bull points were emphasised—the Puss-Moth—the Hawk Moth, and the Intercepter. The Puss-Moth has had a wonderful sale, but have the others? Optimists in the market, however, stoutly maintain that the company will again pay 10%. Market estimates are, of course, largely rumour and guesswork, and I refuse to give my own guess—in case I should be compelled to excuse my garrulity on the grounds that my father was an Irishman, and my mother—a woman!

| | Making-up Price. Dec. 1 | Making-up Price. Dec. 15 | | Making-up Price. Dec. 1 | Making-up Price. Dec. 15 |
|---|---|---|---|---|---|
| De Havilland ... ... | 29/6 | 27/6 | Nat Flg. Services Ord. 2/- | 6d. | 6d. |
| Handley Page 10% 8/- Pf. | 10/- | 10/- | Do. do. Deb. | 40 | 40 |
| Fairey Aviation 10/- ... | 12/6 | 12/6 | Petters ... ... ... | 22/6 | 22/6 |
| Do. Deb. ... | 101 | 104 | Rolls-Royce ... ... ... | 40/6 | 39/6 |
| Imperial Airways £1 ... | 18/6 | 18/3 | S. Smith & Son, 1/- Dfd. | 2/6 | 2/3 |
| D. Napier ... ... ... | 9/6 | 8/9 | Do. do £1 7% Pfd. Ord. | 25/- | 26/3 |

## MORTGAGES AND CHARGES.

SPLINTEX SAFETY GLASS LTD.—Land Registration Charge on land with factory thereon in Morden Road, Merton, dated Nov. 26, 1930, to secure £30,000 and bonuses varying from 6% to 8% according to date of redemption.

Holders:—Shenstone Trust Co. Ltd., 29/31, Dingley Place, City Road, E.C.

SEALANDAIR LTD.—Debenture dated Dec. 1, 1930, to secure £50, charged on the company's property, present and future, including uncalled capital.

Holder:—Cicely M. Jackson, Gorse Bank, Limpsfield, Surrey.

## SATISFACTIONS.

SPLINTEX SAFETY GLASS LTD.—Satisfaction in full on Nov. 26, 1930, of Land Registry Charge dated April 24, 1930, and registered April 26, 1930.

(According to the register of mortgages, the charge registered April 26, 1930, originally secured all moneys due or to become due from the company to Lloyd's Bank Ltd., not exceeding £18,000.)

## NEW COMPANIES.

B. N. AIRCRAFT LTD.—Private company. Registered Dec. 9. Capital £2,000 in £1 shares. Objects: To act as agents for the sale and purchase of and to deal in aeroplanes, seaplanes, flying-boats and aircraft of every description, aeronautical engines and spare parts, etc. The subscribers are:—A. D. S. Barr, 100, Farnaby Road, Shortlands, engineer. A. Cleghorn, 6, Spanish Place Mansions, Manchester Square, W.1, engineer. A. D. S. Barr (director of Speedcraft, Ltd.), is the first director. Solicitors: E. F. Turner and Sons, 115, Leadenhall Street, E.C.3. Registered Offices, Heston Air Park, Hounslow.

KLEMM-HALL AEROPLANES LTD.—Registered as a "public" company on Dec. 8, with a nominal capital of £50,000 in 170,000 6 per cent. non-cumulative preferred ordinary shares of 5s. each and 150,000 deferred shares of 1s. each. The objects are to adopt an agreement with Ertia Trust Ltd., to manufacture, sell, and let on hire aeroplanes, seaplanes, flying-boats and aircraft of all kinds, and the component parts thereof; to build and maintain hangars, garages, sheds, aerodromes and accommodation; to establish, maintain and work lines of aerial conveyances and aircraft; to deal in petrol, oil or other commodities, etc.

The first directors (to number not less than 2 nor more than 7) are:—D. G. Hall, J.P., "Gwentland," Penarth, Glam. (chairman of Hydrogen, Oxygen and Plant Co. Ltd.). W. T. Harvey, 20, Carlton Road, S.W. (joint managing director of Acetate Products Corporation Ltd.). Brig.-General A. Huggins, C.M.G., D.S.O., M.I.M.E., M.I.A.E., 91, Lexham Gardens, Kensington, W.8 (formerly Director of Aircraft Equipment, Air Ministry).

Solicitors:—Herbert Smith and Co., 62, London Wall, E.C.2.

CHELTENHAM AND GLOUCESTER AEROPLANE CLUB LTD.—Private company. Registered Dec. 13. Capital, £100 in £1 shares. Objects: To promote, assist and encourage aerial navigation in all its forms and the study of aeronautics, etc. The directors are: C. Dickins, Cuba Villa, Cheltenham. F. Ayliffe, Mingrove, Balnwood Avenue, Gloucester. R. H. Harmer, St. Michael's Lodge, Eldorado Road, Cheltenham. P. Hough, "Scots Craig," Elmbridge Road, Gloucester. W. R. D. Perkins, Conservative Club, Stroud. G. H. Patterson, "Windsorton," London Road, Cheltenham. Solicitors: Grimes, Madge and Lloyd, 20, Bell Lane, Gloucester.

## PERSONAL NOTICES.

### BIRTHS.

BEAULAH.—On Dec. 13, at Derby House, Parson Street, Hendon, N.W.4, to Dorothy (*née* Wilson), wife of Squadron Leader E. A. Beaulah, R.A.F.—a daughter.

MAXWELL.—On Dec. 14, to Carolyn, wife of Major Gerald Constable Maxwell, M.C., D.F.C., A.F.C.—a daughter.

### MARRIAGE.

KINGSFORD-SMITH—POWELL.—On Dec. 10, at Melbourne, Australia, Air Commodore Kingsford-Smith, Royal Australian Air Force, to Miss Mary Powell.

### DEATHS.

BURKE.—On Nov. 20, as the result of a flying accident while prospecting in British Columbia, Flt. Lt. E. J. A. Burke, R.A.F.O. The Vancouver correspondent of *The Times* writes:—

He was born on August 28, 1890, at Bray, County Dublin, and was educated at St. Lawrence College, Bray. Before the War he was a Civil servant in Dublin, and in December 1915 he enlisted as a private in the Inns of Court Officers Training Corps, from which he was discharged on appointment to a commission as temporary second lieutenant, R.F.C., in March 1917. Three months later he was graded Flying Officer, and on the formation of the R.A.F. in April 1918 he became a lieutenant. From September 1918 to April 1919 he held the rank of acting captain, and received a Press mention by the Air Ministry for his flying services during the War. In October 1919 he was transferred to the unemployed list, but two months later was granted a short service commission as Flying Officer. After a period at the Electrical and Wireless School, he passed the course for flying instructors in 1923, and in July 1924 was promoted to flight lieutenant. He was employed as an instructor at No. 5 Flying Training School, Sealand, Chester, until January 1927, when he was transferred to the Reserve on the expiration of his short service commission. Subsequently he resumed flying in Canada. Flight Lieutenant Burke was a keen sportsman; he rowed well and played both Rugby and Association football.

JOHNSON.—On Dec. 11, at Singapore, in a flying accident, Lionel Francis Willes, of the Singapore Flying Club.

MACKAY.—On Dec. 9, suddenly, at Andover, Wing Commander Charles Joseph Mackay, M.C., D.F.C., R.A.F.

Wing Commander Mackay was born in 1895 at Moate Athlone, West Meath, and was educated at Ampleforth College, the Benedictine College, Engleberg and Trinity College, Dublin. He was appointed to a commission in the 5th Battalion, the Leinster Regiment (Special Reserve) in January 1913 and was promoted to Lieutenant in June 1914. He served in France with his Regiment and was wounded in action in May 1915. He learned to fly on a Maurice Farman biplane at Shoreham and his Royal Aero Club certificate, No. 1895, is dated Sept. 25, 1915. In November 1915 he was seconded to the Royal Flying Corps and appointed Flying Officer. At the same time he was promoted to Captain in his Regiment. He went to France again in December 1915 and was appointed Flight Commander, R.F.C., in July 1916.

In December 1916 he was awarded the Military Cross for conspicuous gallantry in action. The *London Gazette* describes how, in very unfavourable weather, he obtained most valuable photographs of the enemy position and fought four hostile machines for ten minutes until assistance came and they were driven off and he continued his work with the Artillery. In December 1917 he was appointed to command a Squadron and on the formation of the R.A.F. in April 1918 he resigned his Army Commission on appointment to a commission in the R.A.F. with the rank of Major.

On April 18, 1918, the *London Gazette* announced that he had been awarded the Croix de Guerre (France) for distinguished services rendered during the course of the campaign. In January 1919 he was awarded the Distinguished Flying Cross in recognition of distinguished services during the War. In August 1919 he was appointed to a permanent commission in the R.A.F. with the rank of Flight Lieutenant.

At the end of 1920 he was appointed to the Directorate of Operations and Intelligence at the Air Ministry and in June 1922 he was promoted to Squadron Leader. In May 1924 he was posted to the R.A.F. Staff College for a course at the end of which he went on a tour of inspection in Egypt, Palestine and 'Iraq. In September 1925 he was appointed to the Air Staff, 'Iraq, for detached duties, and in February 1927 he was posted to No. 216 (Bomber) Squadron in Egypt. During 1929 he attended a course at the Imperial Defence College and in January 1930 he was promoted to Wing Commander and appointed to the R.A.F. Staff College, Andover.

Wing Commander Mackay won the First Prize and Gold Medal in the Royal United Services Institution Essay Competition in 1919 and in 1929 and the Gordon Shephard Memorial Essay Prize in 1919 and 1921.

The death of this gallant and distinguished officer is a great loss to the Service.

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**The Aircraft Operating Co. Ltd.**, 8, New Square, Lincoln's Inn, London (Holborn 8131), and Broken Hill, Northern Rhodesia; Rio de Janeiro, South America; Contractors to the Ordnance Survey, Drawing Offices and Laboratories, Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

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**Gipsy Moth (Wooden).** 10 hours. C. of A. July, 1931. Slots, two compasses, special windscreen, upholstery and luggage lockers. £550.

**Gipsy Moth (Wooden).** 100 hours. C. of A. twelve months. Slots, compass, extra tank. £515.

**Gipsy Moth (Metal).** 320 hours. Hours since top overhaul 10. C. of A. September, 1931. Slots. £450.

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**X type Moth**, G-EBZH; total hours since complete overhaul, 90; C. of A. expires August, 1931; split undercarriage; compass, etc.—£385.

**Bluebird**, G-AAVV; total hours since overhaul, 115; Gipsy engine; slots; compass, etc.; C. of A. April, 1931.—£325.

**Widgeon**, G-EBRM; total hours since overhaul, 416; engine, 15; compass; racing centre-section tank; many spares; repainted; C. of A. 12 months—£425. Cash or deferred terms.

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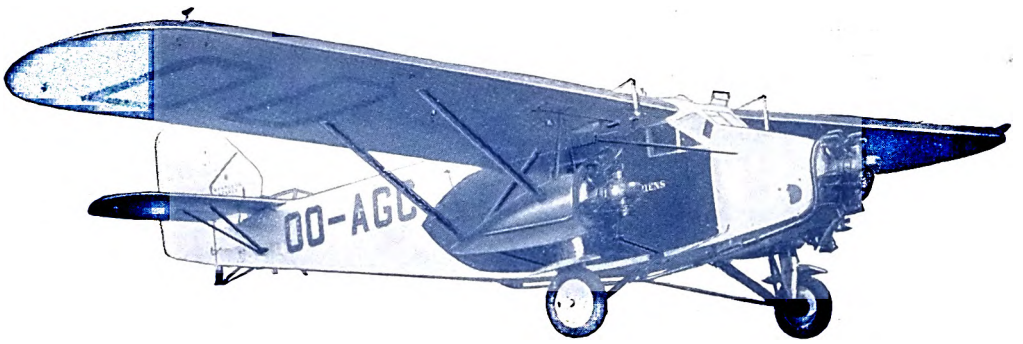


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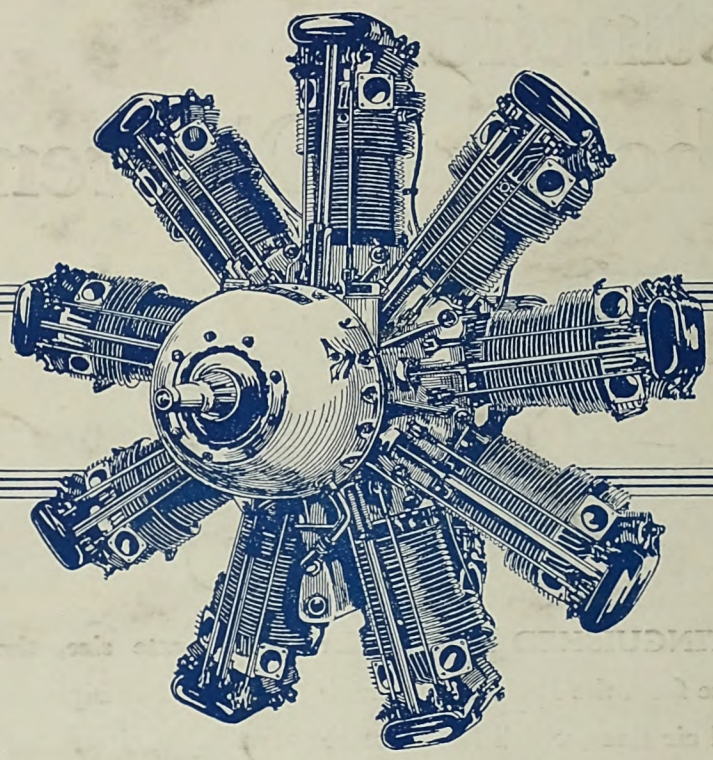

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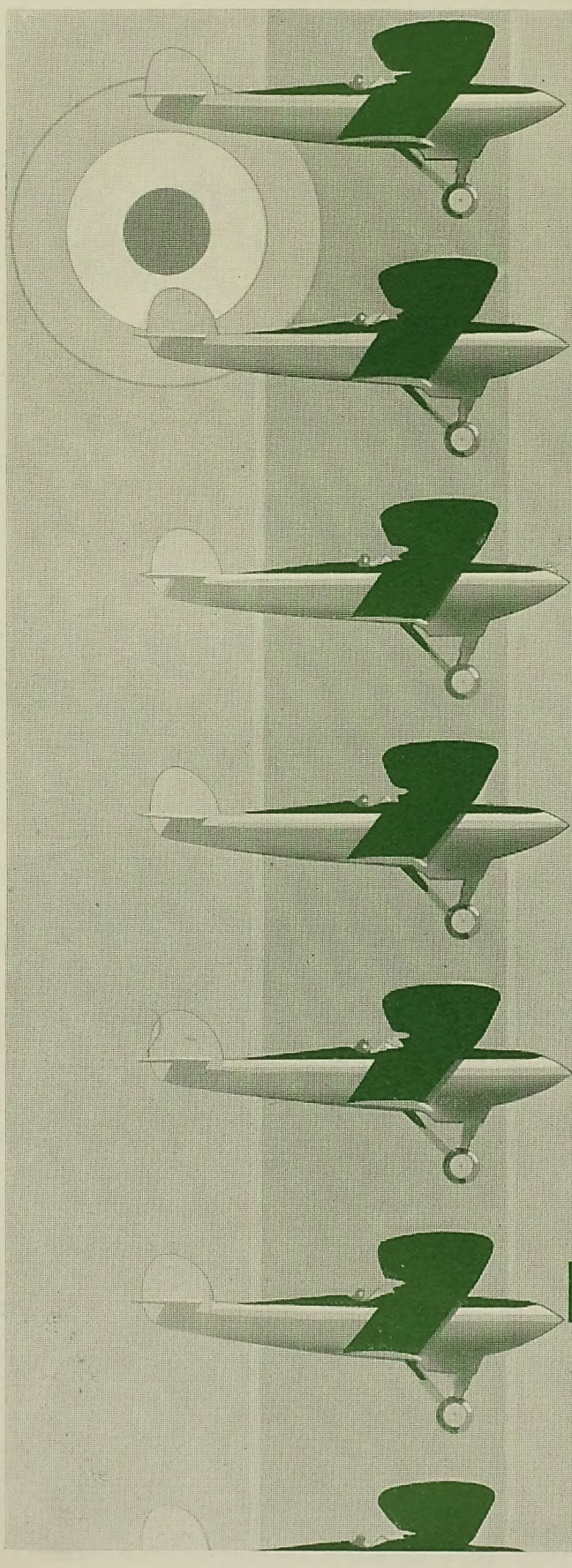


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## ON THE STATE OF TRADE.—I.

By way of being thoroughly cheerful this Christmas-tide let us discuss the World-wide Depression in Trade about which all the World's newspapers have been talking for the last twelve months or so. The British Aircraft Industry is probably suffering less from the World-wide slump than any other industry in the World, and therefore we can discuss the situation with a lighter heart than most people.

The first thing to recognise is that the depression is nobody's fault in particular and is everybody's fault in general, merely because humanity is naturally foolish. Thirty or forty years ago, Mr. Bernard Shaw, who probably stole or borrowed the phrase from somebody else, enunciated the theory that if all the labour in the world were properly organised there would be no need for anybody to do more than four hours' work a day. That is probably absolutely correct, so far as manual labour is concerned. But it would not apply to the directive heads of manufacturing firms or agricultural undertakings, or even newspapers. For example, even in this little office there is pretty nearly eight hours' work a day, merely dealing with personal correspondence and callers, without allowing anything for writing articles or for ordinary editorial work. And I have never yet discovered a method by which anybody else can deal with letters written from all over the World and all over the British Isles to the Editor personally.

I am pretty sure that the directive heads, who are the moving spirits, of our more enterprising business firms, could not get their own work down to eight hours a day. In fact, most of their very important work is probably done under the guise of play. That is to say, more big business deals are fixed over the dinner table or in the course of an evening party than are ever done in offices. There are today certain very important aircraft firms, whose operations and whose products have affected the history of the World, who in fact came into being either as a joke or as an after-dinner afterthought. And in other great industries, the same thing holds good.

Nevertheless, if labour could be properly organised, and if time which is wasted could be saved, and if every man worked his hardest while he was at work instead of merely trying to fill in the time till he could go and play, undoubtedly the mass of this World's goods could be produced so as to

"THE NODDING HORROR OF WHOSE SHADY BROWS
THREATS THE FORLORN AND WAND'RING PASSENGER."
(MILTON—*Comus.*)

ON THE WAY TO INDIA.—Mount Olympus, seen from a Short Calcutta of Imperial Airways Ltd. off the coast of Greece.

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allow everybody to work much shorter hours (even if they had to work much harder) and provide everybody with a decent living and a reasonable number of the hours per day in which to improve themselves and enjoy themselves.

We have an example of the kind of thing I mean in Australia. There are people in the big cities of Australia who are actually starving and who cannot afford to buy clothes, and yet Australia's present unfortunate financial position is entirely due to the fact that she cannot sell the stocks of wheat and wool which are at present lying in Australia. Things are nearly as bad in Canada, and yet there is probably enough wheat and other things in the grain elevators to feed all the hungry people in Canada, and to feed the whole of the British Isles as well. So obviously, there must be something wrong, not necessarily with the particular organisation of Australia and Canada but with the whole social arrangement.

### Co-operation or Communism.

Similarly, people want agricultural instruments or machine tools or any other product you like, which the manufacturers of those products cannot sell. And at the same time, the people who want them cannot produce whatever it is that they do produce for a living because they cannot afford to buy these tools or instruments.

Evidently what is wanted is some kind of Central Staff organisation to find who wants certain things and who has got those things, and arrange an exchange of goods, so that everybody can get the things that they do want and can get rid of the things that they don't.

A Central Staff organisation of that kind could only come into being under a system of World-wide Socialism, or under a system of World-wide financial control by one particular group of financiers Each of those systems is equally impossible, simply because the average human being is an individualist. But something approaching that state of affairs may be achieved under Communist rule in Russia where the great mass of the people are like so many sheep and can be ruled quite easily by a few thousand clever and thoroughly unprincipled men, who are banded together for the purpose.

The general scheme is shown by the network of air-ways which is being organised all over Russia for official use, and by the Turk-Sib. Railway, which is intended to carry Siberian wheat to feed Turkestan, and Turcoman cotton to clothe Siberia,—so that each country may only grow what it is best suited to produce.

Obviously, when once such a system is got into working order, it is simply asking for one man to take hold of the whole central organisation as Dictator or Emperor, and to start out on a career of conquest on his own account. Which we may expect when the Five-Year Plan is completed.

The one other way in which this proper distribution between producer and consumer can be operated is under some system of co-operation. In Western Europe, at any rate in Germany, Scandinavia, Holland and the Nordic portion of the British Isles, the spirit of individualism makes co-operation difficult. But there is just a possibility that with improved education people may arrive at the state of being willing to co-operate with one another without in the least subordinating their individuality to those who are locally in charge of the co-operative system.

There is no doubt that all over the World there is a movement in some direction which we do not understand towards providing better conditions of life for everybody. Like all revolutions, whether religious or industrial, the movement has started from the top, among the intellectuals, and very largely among the aristocracy, and it has jumped straight from them to what are commonly called the "lower classes." And the last people to appreciate what the movement means are the more or less well-to-do industrial middle classes.

In Russia the movement has taken the direction of exterminating the middle classes. That was fairly easy because in Russia there was practically no intermediate class which counted between the aristocracy and the lower classes, whether they were peasants or industrial workers or whatnot. In Western and Northern European countries the great solid middle class is in fact the most powerful portion of the community. It is financially strong enough to control the finances of its country, and it is numerically strong enough to knock the stuffing out of a Communist mob if anything in the nature of mob law is attempted. We have seen that several times in Germany during the last twelve years, and we have seen it twice in England during that period, when attempts have been made at a general strike.

Therefore, taking a long shot as a prophet, I suggest that we shall in due course arrive at a somewhat elaborate system of co-operation in this country, in which people will really work hand in hand in a friendly competitive way which will be good for trade, instead of merely trying to cut one another's commercial throats.

### Our Own Business.

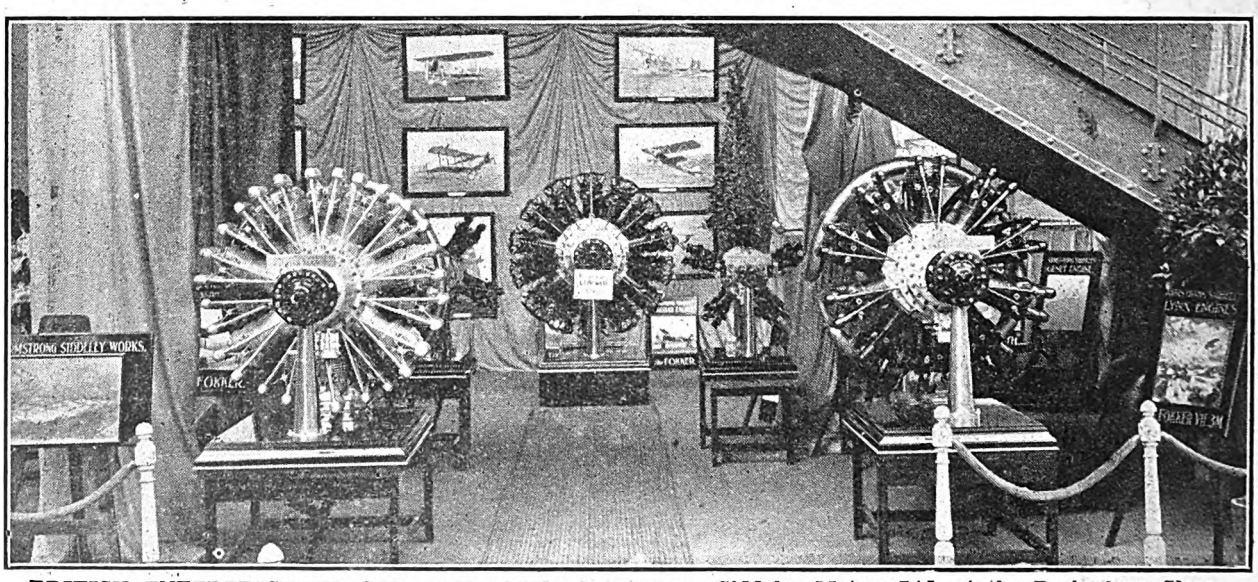
In our little corner of British industry, we see something of this sort approaching. Until a few years ago any hopes of co-operation between members of the British Aircraft Industry would have been absurd. Some few years ago some few members of the Trade co-operated in an exhibit at Gothenburg in Sweden, which quite surprised our Continental competitors. And, as was noted in The Aeroplane last week, the British Aircraft Industry did actually agree to a co-operative exhibit at the Paris Aero Show and were only stopped by the refusal of the Paris Authorities to allow such an exhibit.

Actually, that was a very good thing, because nothing is more likely to encourage the spirit of co-operation between British manufacturers than for some foreign country to tell us that they don't mind us coming as individual manufacturers but will not have us coming there in co-operation. In the first place, it rouses all the Englishman's natural obstinacy and combativeness, and in the second place it shows us that the foreigner is afraid of us,—if we co-operate.

### Buenos Aires.

We all hope to see, early next year, the finest example of co-operation between British manufacturers that this country has yet produced. We are to have an exclusively British Exhibition at Buenos Aires, which is the most important commercial centre in the whole of the vast Continent of South America.

Buenos Aires is to South America rather what Paris is to Europe. It is a very fine city with every modern convenience, and everybody in South America is glad of an excuse to go there on business so that they can have a full-out holiday at the expense of their businesses or Governments as the case may be. Therefore, there is no doubt that everybody of importance in South America will flock to Buenos Aires to see our British Exhibition. And no part of that




**BRITISH ENTERPRISE ABROAD:—The stand of Armstrong-Siddeley Motors Ltd. at the Paris Aero Show.**

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Exhibition will be of greater interest to the visitors than the aeronautical part.

Just what aeroplanes are to be shown in the Exhibition itself I do not know at present, but I gather that there will be enough of them to make quite a good display and to give visitors at the Exhibition a chance of seeing first-class British workmanship in aircraft at close quarters. But the really important exhibit from our point of view will be in the air.

We are assured that one of His Majesty's aircraft carriers will be sent to Buenos Aires with a load of British aircraft, some of which will be flown off the deck of the aircraft carrier as an exhibition of deck-flying aeroplanes for South American navies, and some of which will be landed and sent to the Buenos Aires aerodrome at El Palomar to be demonstrated therefrom by some of our best pilots.

So far South America has never seen any first-class flying such as that to which we are accustomed in this country. The magnificent mail-carrying machines of the Aéropostale Company deliver the mails from Europe with at least as much regularity as do the steamship lines, and in about one-third of the time, in spite of the fact that five days out of their ten days are taken up in crossing the South Atlantic by boat. But these great postal aeroplanes do not give exhibitions of flying for the benefit of the peoples of the South American nations.

The Republic of Argentina and the Republic of Chile own a fair number of British aircraft, both in their Armies and their Navies, which, of their kind, are unsurpassed. But they are general purpose machines of the bigger kind, or are light training machines, and are used as such.

Consequently, we can assure our South American friends that they will get a very pleasing surprise and will be considerably astonished when they see how our very latest fighting aeroplanes and our very latest air transport machines perform when demonstrated by first-class English pilots. And when these demonstrations of the complete superiority of British aeroplanes are given at Buenos Aires, let us remember that they could not have been given except through the co-operation of the various aircraft firms which will there be represented.

Therefore I would like to impress on everybody in the aircraft industry, not only aeroplane manufacturers and engine manufacturers, but also the people who make the raw material and the parts and the accessories for aeroplanes, that the more we can all co-operate in impressing on the whole world the superiority of British aircraft, for war or peace, the sooner we shall see that boom in the Aircraft Industry which must come sooner or later. But we must remember that co-operation alone is not enough to bring prosperity to the Aircraft Industry. We must also have the right things to sell.

### MEETING THE MARKET.

One of the standing charges against British manufacturers in every line of business is that the manufacturer makes what he thinks he would like to make and then sends out his unfortunate travellers to sell the stuff. If the traveller fails to sell the manufacturer's products, whether at home or in foreign countries does not matter, then the manufacturer tells him that he is a rotten bad salesman. I have tried it, and I know.

We have all kinds of aids to salesmanship. We have schools of salesmanship and we have schools of advertising, and we have even an Association of Sales Managers, which held a dinner the other night at which his Royal Highness the Prince of Wales was the guest of honour. But all the salesmanship in the World will not sell things which people do not want.

What we want a great deal more than a school of salesmanship is a school for manufacturers which will teach them how to study the markets which they want to cultivate and how to pick out for manufacture what those markets will buy. If manufacturers were only to make what the public wants, they would have to spend far less on salesmen, and (though I should be the last person to say so) on advertising.

### A CASE IN POINT.

A few nights ago I had a most interesting argument on this subject with two of our leading aircraft manufacturers. I had enunciated the theories just stated, and one of them retorted by pointing out that of all the manufacturers in the world who is inflexible in selling what he makes instead of altering things to suit the customer, the American manufacturer is pre-eminent. And yet, he objected, the American manufacturer is always being held up to us as being so much more willing to meet the customer's demand than is the English manufacturer.

That is perfectly true—up to a point. We can take the English motor trade as an excellent example. The difference is this. The English motor manufacturer, until a few years ago, made the type of car that he himself—generally a man without any imagination—had got into the habit of driving on English roads. His unfortunate salesmen went out to try and sell that car to the British Dominions and found the Dominions full of American cars already, because the English manufacturer had neglected the Dominions in order to cultivate the home market.

To meet the demand in the Dominions, and the complaints of his salesmen, the British manufacturer then started putting on bigger wheels and putting in wider axles to existing cars and putting in various and sundry gadgets which were standardised in all American cars, and he expected the salesman to charge the customer extra for these luxuries. And then he was surprised that the small high-speed English engines refused to lug the bigger wheels and longer and heavier axles and all the extra gear in the car through sand or through bogs without boiling.

The American manufacturer, on the other hand, designed his car in the first place to work under those conditions, and when he went to sell it in the British Dominions there was no need for him to alter anything. Worse still, he found that tens of thousands of people in this country liked the fully-equipped American car better than the skimpy English car. And we are only now beginning to compete.

Perhaps in the course of a year's running a certain type of American car might show weakness in a certain place, or the manufacturer might discover that there was a demand for some additional instrument or fitting or gadget which was not in his previous year's car, and then he stored all these things up till he brought out his next year's type of car and embodied all these things in it as improvements. But when once he had laid down his pattern for the year he refused to alter it and he was ready to stand or fall by it He stuck to his standardised type, but he saw that it met the public demand.

We have a perfect example of the different mentalities in the use of four-wheel brakes. I cannot remember any English car which had four-wheel brakes as a habit before the War 1914-18, but the Italian Bianchi car certainly had four-wheel brakes in 1914. The Americans saw the advantage of four-wheel brakes, and fitted them as a standard, certainly not later than 1922 or 1923. The four-wheel brakes on British cars was certainly not a standard fitting on every car in the Trade until somewhere about 1928. That is to say, that it took us in this country fourteen years to see the benefit of a fitting which clever Mr. Bianchi realised all that time before.

### EXPERIENCE TEACHES.

One of my friends, in the course of his argument, pointed out that the most standardised thing, and about the most successful, in the whole of the British Aircraft Industry is the De Havilland Moth. And he said that the De Havilland Company were firmer than anybody else in refusing to alter their machines in any way to please anyone, and yet they got away with it.

The answer to that is very simple. The De Havilland Company is run entirely by men who are themselves either very good pilots or very keen aviators, and very good engineers. They discovered for themselves what the private owner needed long before the private owner himself even existed. Consequently, they made what the market wanted before the market knew it wanted it.

There is just one thing which is better than making something that a customer demands according to the way he wants it, and that is offering him something he really does want although he never knows he wants it till he sees it. And that is exactly what the De Havilland Company did. And as each successive type of Moth or Gipsy engine has been produced the first of the type has been quite worn out by people in the firm, so that they have discovered themselves any weaknesses before any of their customers have discovered them.

The result has been that by the time one year's output of Moths has been put into use in the various parts of this world, a lot of possible improvements have been discovered by the manufacturers themselves, and the firm is ready in the next year to offer something which is distinctly an improvement on the previous year's type.

That is the way to get the market in civil aircraft. And when all is said and done, the market in war machines is not so very different. During this last twelve months the Fairey Company and the Hawker Company have both done very good deals with foreign nations in war machines. And they have done their business simply because their aeroplanes were so vastly better than the buyers could even have imagined. The buyers had some sort of an idea of what they wanted, but the British firms went and showed them something which they then realised that they wanted very much more than they wanted what they first wanted.

That sounds complicated, but it is the basic truth below all first-class salesmanship. Produce an article of that sort in any line of business that you like, set first-class salesmen to sell it, advertise it intelligently and largely, and you can devastate the world with it, whether it be a new gramophone or a new car or a new aeroplane, or anything else.

*(To be continued.)*

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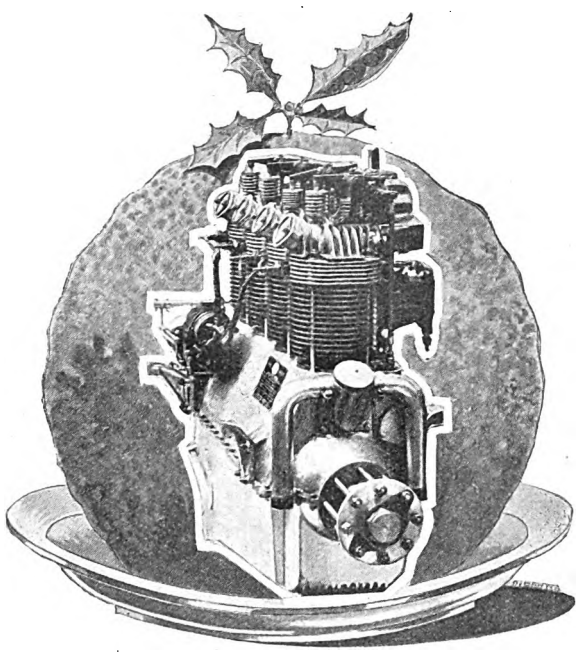

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## THE LONDON CHAMBER OF COMMERCE AND THE POSTMASTER-GENERAL.

The Postmaster-General, with whom was the Director of Postal Services, received a deputation from the London Chamber of Commerce led by the President, the Lord Herbert Scott, on Dec. 16 at the General Post Office. Mr. Montague, the Under-Secretary of State for Air, and Mr. Bertram, Deputy Director of Civil Aviation, were present.

The other representatives of the London Chamber were Sir Geoffrey Clarke, Deputy-Chairman of the Council of the Chamber, Col. the Master of Sempill, Chairman of the Civil Aviation Section, Sir Robert McLean, Deputy-Chairman of the Civil Aviation Section, and Mr. A. de V. Leigh, Secretary of the Chamber.

Lord Herbert Scott, introducing the Deputation, said that the Council of the London Chamber, in which some 60,000 firms and companies were represented, had been very much disturbed to find that in the matter of night flying other countries had been first in the field. Countries which had the enterprise to start night flying would give an immense impetus to their aircraft industry and gain prestige for it amongst other nations.

Col. the Master of Sempill said that the Chamber was glad to note that the Post Office and the Air Ministry agreed that night air-mail services were essential. Purely mail-carrying air services were essentially matters which concerned the efficient discharge of the monopoly which the Post Office had for the carriage of mails and that, as in the United States, the Postmaster-General should be empowered to arrange for services, make contracts and generally speaking take all the necessary steps that will lead to the modernisation of British Mail Services.

Although the policy of the Post Office was against establishing new services themselves, he thought that policy should be modified in view of the special conditions in connection with the creation of air mail services. The Chamber believed that satisfactory progress could not be made until the Post Office accepted financial responsibility for the provision of rapid air-mail services.

He referred to the proposal put forward earlier in the year to the Postmaster-General and the Air Ministry for the inauguration of non-stop night air-mail services to important centres up to 1,000 miles from London, which would drop mails by parachute on the way, and so save from 1½ to 2 days in delivery. He suggested that a portion of the huge surplus paid by the public to the Post Office for efficient mail services might be utilised to provide this modern facility which other nations enjoy.

Sir Robert McLean stated that at present 6½ days in Summer and 7½ days in Winter were taken by the Air Mail to reach Karachi from London, a little over 5,000 miles,—which meant that in Summer the distance was covered at about 28 miles per hour. The time saved over surface transport was only 7 days.

The cruising speed of the machines now in use was about 85 m.p.h., and the low average speed was due to passengers being carried as well as mail. Passengers could not yet travel by air at night, and therefore over long routes passengers and mail could not be combined with advantage.

Experience in America and on the Aéropostale route to South America showed that 2,000 miles per day was no great undertaking for an air mail machine, with routes lighted for night flying, and 1,000 miles per day was quite feasible even where there was no night flying. [Which is what The Aeroplane has been preaching for six years or so.—Ed.]

Multi-engined machines, which were safe over any terrain, were now being built with a cruising speed of 125 miles per hour carrying more than a ton of mail over a range of 800 to 1,000 miles. If sections of the route to India were lighted for night flying in both directions, a 3½ day schedule to Calcutta would be well within practical possibility. Over the greater part of the route East of Cairo, flying conditions were better by night than by day.

If Calcutta could be reached in 3½ days, given a good ground organisation Sydney could be reached in 7½ days and Wellington, New Zealand, in 8½ days. Already, without arrangements for night flying, the Dutch Air Lines had flown from Amsterdam to Batavia, 10,000 miles, in 9½ days, and Wing Commander Kingsford Smith had reached Port Darwin, 12,000 miles from Croydon, in 9½ days.

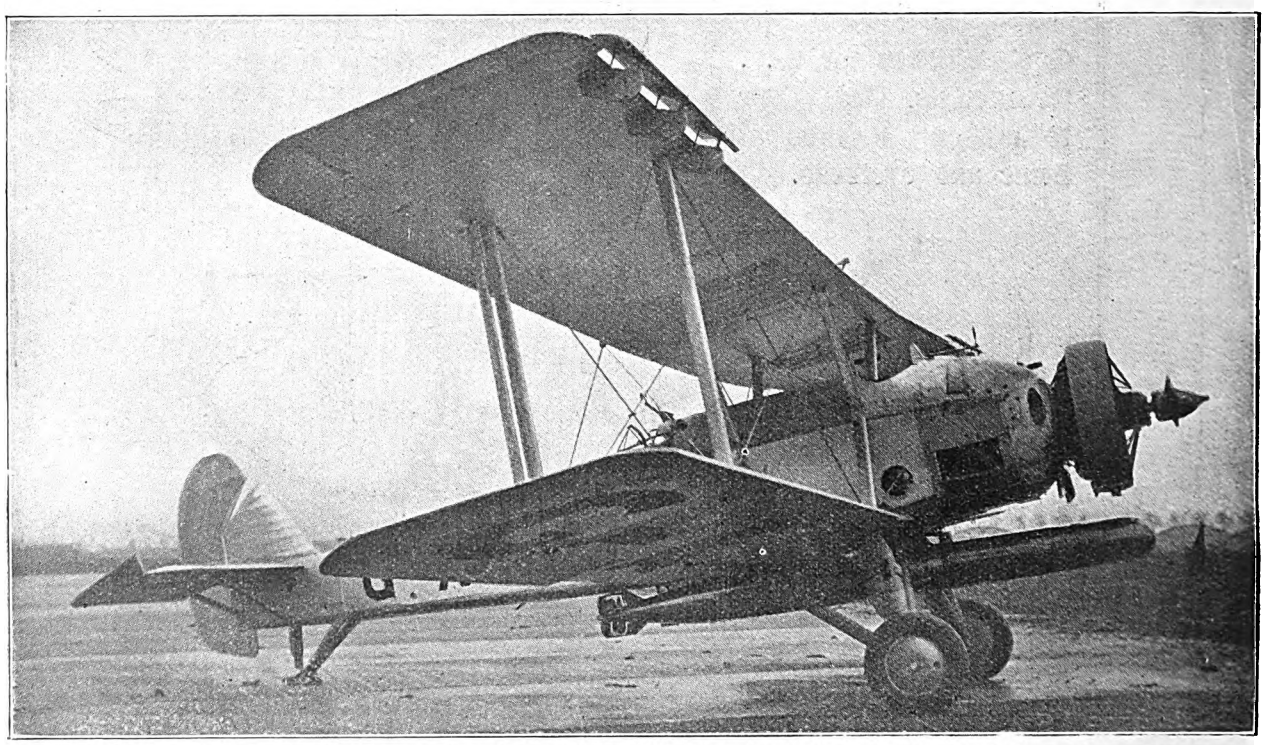
If mail services could be run on these lines, the Chamber felt confident that they would appeal to the commercial community more than the present air services.

Sir Robert also alluded to the delay in completing the air route across India and beyond. [To which The Aeroplane has constantly referred.—Ed.] The Chamber wished to urge the Postmaster-General to bring to the notice of the Government of India the importance of an agreement in this matter in view of the need of rapid mail communications to all parts of the Empire lying beyond India and the value to the business community in India itself of being able to use a rapid air-mail service East and West of India.

Sir Geoffrey Clarke said the Chamber desired to urge the introduction of ¼ oz. as the unit of weight for air mail letters instead of ½ oz. as at present, with a corresponding reduction in charge. The Chamber believed that the present high initial charge of 6½d. was seriously curtailing the use of the service and that even with an initial charge of 4d., which should be inclusive of postage and air fee, more than double the present quantity of mail would be carried by air.

If the quantity were doubled, the Post Office would stand to gain 1½d. in every ½ oz.: Imperial Airways, who were paid on the basis of so much per lb., would be in exactly the same position as at present, and the public would be given a very much cheaper service.

He could not believe that the fact that post offices were not provided with ¼ oz. weights,—which, he understood, had been advanced by the Post Office as an objection to the proposal,—was intended to be taken seriously. To supply these weights in all the post offices throughout the country would not cost more than a few hundred pounds.



**BRITISH ENTERPRISE ABROAD.—A Vickers Vildebeeste (Bristol Jupiter geared engine), complete with guns and torpedo, at Le Bourget, Paris, for demonstration to visitors from foreign countries to the Show.**

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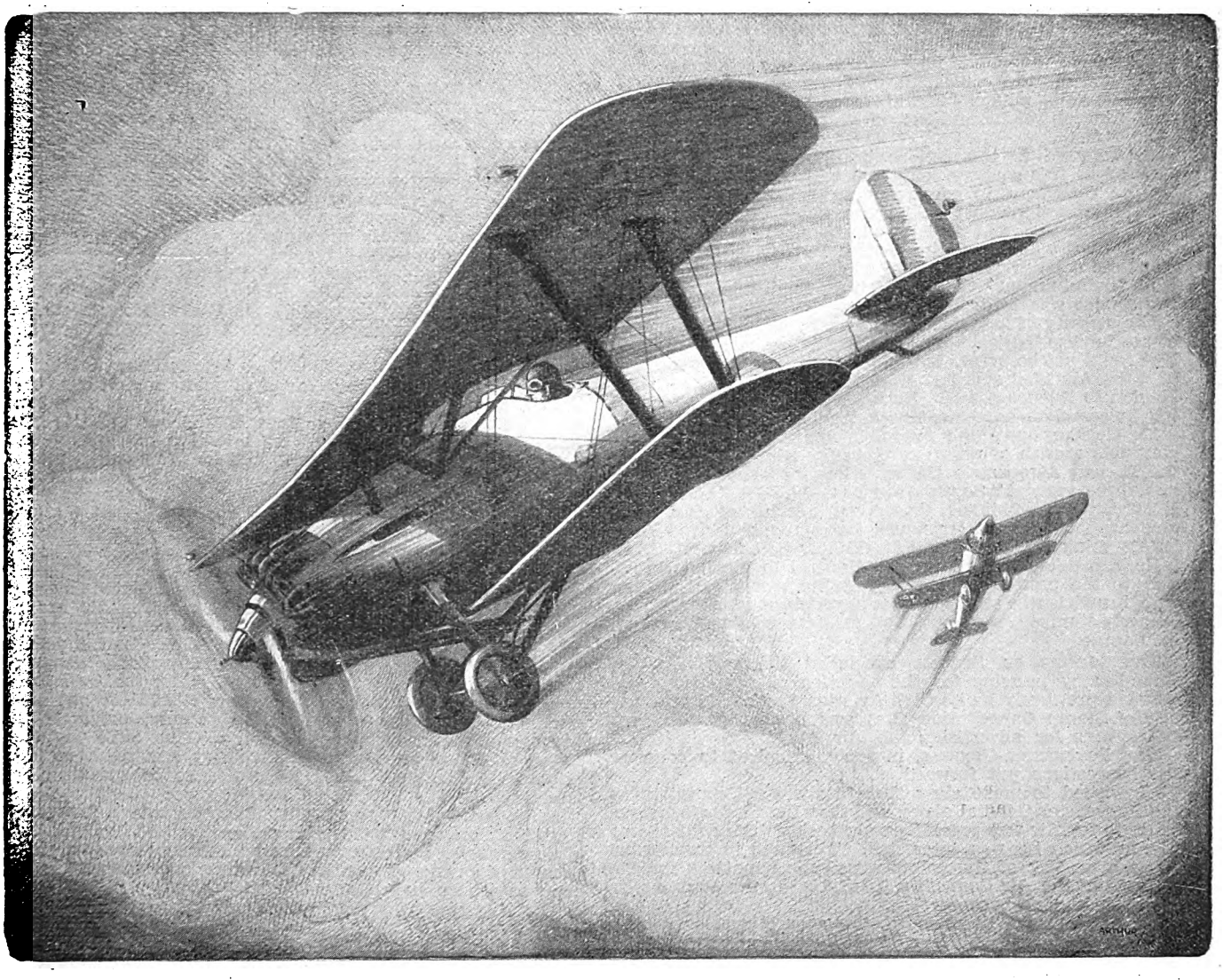

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As for the difficulty of the public adapting themselves to the use of lighter paper and envelopes, he referred to his experience as Director-General of Posts and Telegraphs in India where the public had readily adapted themselves to the ½ to 'la, the equivalent of 1/5th oz., as the initial weight. The public, he said, always adapted themselves to the initial weight and 80% of the mail went by it whatever it was.

He referred to the serious handicap under which we suffered in this country compared with our business rivals on the Continent in corresponding with South America. The initial weight on that Service was 5 grammes costing 1s. 6d., and this was used by our Continental competitors. Owing to the action of the British Post Office in refusing to accept a letter for Air Mail at a lower initial rate than ½ oz., the minimum price at which an Englishman could use this service was 4/2d.

The urgency of introducing this ¼ oz. weight in time to be of use for the British Empire Exhibition at Buenos Aires in 1931 could not be overstated, especially when it was realised that the Air Mail saved 13 days in transit for letters from London to Buenos Aires. [Here again a speaker finds himself in complete agreement with The Aeroplane.—Ed.]

Sir Geoffrey gave the following figures showing the remarkable growth of postal receipts for Air Mail carried by the French Aéropostale Co. at a low initial weight in the last three years to South America:—1928—£22,500; 1929—£76,000. 1930—£160,000 (based on results of first nine months). Of this latter figure the amount derived from letters going out of England would only be about £7,500.

He also asked the Postmaster-General to give consideration to the possibility of changing the method of dealing with insufficiently stamped letters, which at present, if not properly stamped, were put back for despatch by the steamship route.

The Master of Sempill concluded the case for the Chamber by pressing for the adoption of suggestions put forward previously by its Civil Aviation Section, for the use of the Stamp Cancellation Dies and posters on the Post Office vans for advertising the Air Mail.

The Postmaster-General, in reply, promised to consider the suggestions put forward .

He wished to make clear that this was a Deputation to the Postmaster-General alone, and that the Under-Secretary of State for Air was present purely because the subject was one in which he was interested. This was important because a number of the points raised were matters for the decision of the Air Council, with which he, the Postmaster-General, had no concern.

He dealt first with some of the suggestions.

International Regulations forbade the sending of insufficiently prepaid letters by air, but a mutual agreement to waive this rule had been suggested to India, and a reply was awaited.

Concerning the reduction of the minimum weight to ¼ oz., though he would consider the proposal again, he felt difficulty in being enthusiastic about a suggestion which, in his view, was only of importance in the case of one service and that not an Imperial Service. [Surely reduced fees to India and Australia still concern an Imperial Service.—Ed.]

On the question of the extension of the air mail service across India, the Postmaster-General said he must make quite plain that the matter was solely for the Indian Government to decide, and that he had no concern with it whatever. [Does his influence count for nothing?—Ed.]

On the question of propaganda, he stated specifically that it was not, and never had been, the function of the Post Office to advertise any one of its services against another. For example, the European telephone service was competing with the Air Mail, as it was with other non-Government services, and he would not certainly be prepared to give an advertisement of the Air Mail first claim to the use of cancellation dies or Post Office vans, even if it were decided to utilise these media for propaganda.

He added that it was the duty of the Post Office to give full information about its services, but not to urge the use of one service in preference to another and he could say that the Air Mail got more advertisement one way and another than any other Post Office Service. [Of course, advertising a service which will improve International Trade and our finances, is no concern of the Post Office.—Ed]

It had been suggested to him that there should be a faster service to India. This was primarily a matter for the Air Council but, so far as the Post Office was interested, he could say definitely that reliability was of much more importance than speed, so far as the posting public was concerned. [Why not combine both?—Ed.]

He wished in conclusion to say something about the main proposal of the Chamber, that is, the establishment of night flying mail services to various places in Europe.

He doubted whether the development of Civil Aviation was such as to offer, at any rate for some time to come, the standard of reliability on which the Post Office must insist in the interests of its clients. Indeed, the information to hand indicated that, in Winter at any rate, even a 50% regularity was not to be looked for. [Surely if people are satisfied enough with the degree of reliability of night flying they will use the night mail,—and will send duplicate letters by surface transport,—as they do now on the Aéropostale service. An analogous case is the habitual duplication of letters on the Trans-Siberian route by letters sent by the long sea route.—Ed.]

Secondly, the matter was clearly one for international co-operation, and not for any one country to deal with. Accordingly it had been considered by an International Conference which sat recently in Brussels. That Conference had called for certain data which would be considered by another conference comprising all European countries which was to meet *in the Autumn of* 1931. [How these Officials do hustle!—Ed.]

Thirdly, it was estimated that the network of services proposed would cost roughly £1,000,000 a year, which it was suggested should be paid by the Post Office. [Nothing of the sort was proposed. This is a sheer bluff to avoid responsibility.—Ed.]

He wished to stress the fact that aviation was not being developed solely for the carriage of mails and it was for that reason that the function of subsidising it had been laid by Parliament, not on the Post Office, but on the Air Ministry. He personally had no intention of seeking the transfer of this duty to himself, and he proposed to maintain the view that the Post Office is, and must be an ordinary customer of the Air Companies. It would be appreciated that the subsidies must be controlled by one authority. [There is no question of subsidy, it is only a matter of adjusting rates and buying cargo-space.—Ed.]

Incidentally, the Postmaster-General remarked that while offering no comment on the policy adopted by the U.S.A., in requiring the Post Office to subsidise Air Mails, whereas the British Post Office made a record profit of £9,000,000 last year, the American Post Office had a deficit of £13,000,000; the most recent figures available show a loss of £1,400,000 on air mails alone. [But the U.S. Post Office did not mind making a deficit of £13,000,000 out of a population more than twice as big as ours, and a trade turnover of about five times as much. That is to say the U.S. Post Office, already making a heavy loss, ready to lose another million and a-half for the sake of speeding up trade.—Ed.]

He understood that the London Chamber was in favour of rigind economy in the Government service, and he could not quite reconcile their resolutions on the subject with their present proposals. [And that is a sample of the people we elect to govern us! Serve us right.—Ed.]

## THE KING'S CUP RACE.

The following letter deserves the attention of all who are concerned for the progress of British Aviation:—

Sir,—I heartily endorse the views on the King's Cup Race expressed in your leading article this week.

While I know nothing of the arrangements proposed for the 1931 event, if the rumours on which your article was based are correct, I think that the decision of the Royal Aero Club is to be greatly deplored.

In other competitive sports, such as Bisley and the Royal Tournament, which His Majesty the King is graciously pleased to encourage, His Trophy is awarded surely to the *best*, regardless of artificial handicaps or other conditions which might confuse the main purpose of bringing out true merit.

The King's Cup Air Race is our one important national flying event, and as such it has come to be keenly followed throughout the Empire and in the majority of foreign countries. Consequently this race has assumed a great deal more importance, not only commercially but from the point of view of British aeronautical prestige, than may be realised by those people who treat it as a sort of glorified Garden Party.

You mention that rumours leak through the swing doors on the first floor of No. 3, Clifford Street, and when I refer to the commercial importance of the King's Cup it reminds me that I heard that within the Holy of Holies someone accused the Trade of spoiling sport. I should like to ask that gentleman if the trade of horse breeding is spoiling the sport of hunting. [Or racing?—Ed.]

The decease of the Aerial Derby is regrettable enough, but must we allow the King's Cup to sink to the insignificant level of a suburban motor cycle club outing?

If we are to "improve the breed" and show the people of this country, and the World at large, what can be achieved in the way of performance by good design, reliable engines and skilled airmanship, the King's Cup must be open to all, and formula should be substituted for "form" handicapping. Competitors should try to beat the field rather than to catch the handicapper.

Limiting the runners and reserving some glory for the poor amateur with his "common Moth" are considerations which should present no difficulty to arrange, but His Majesty's coveted Trophy should go to a combination of aircraft, engine and pilot, which England should be proud to possess.

(Signed) F. N. St. Barbe.

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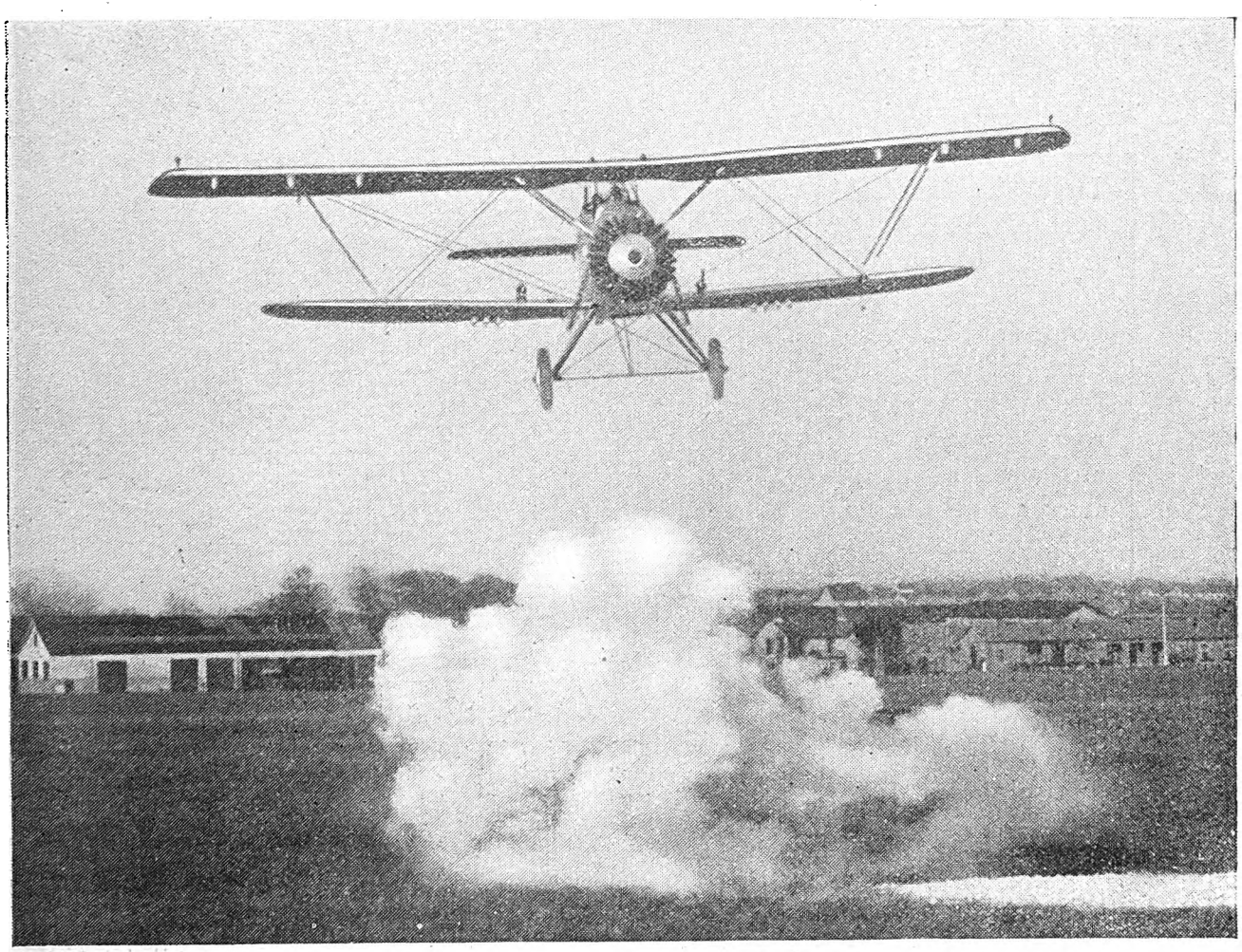

The Atlas Low Bombing




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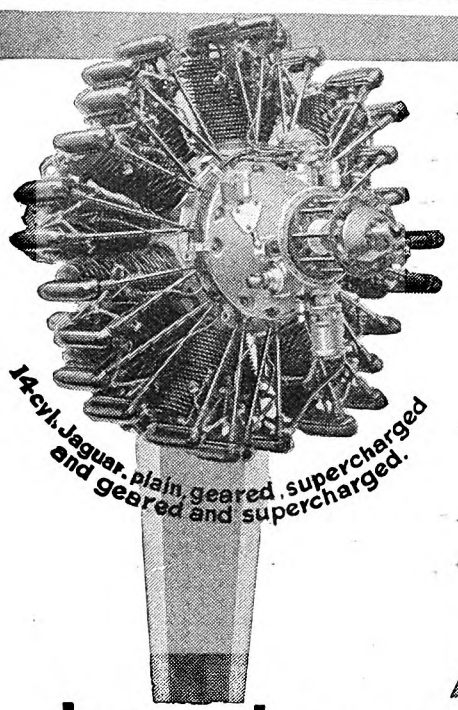


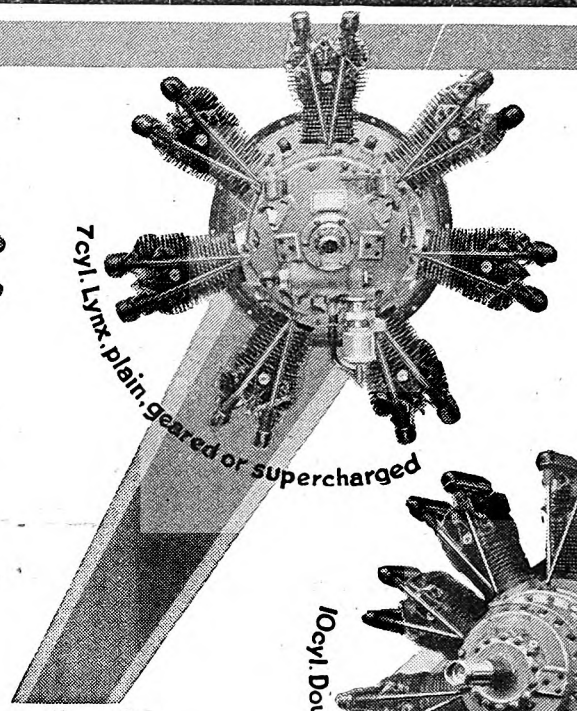


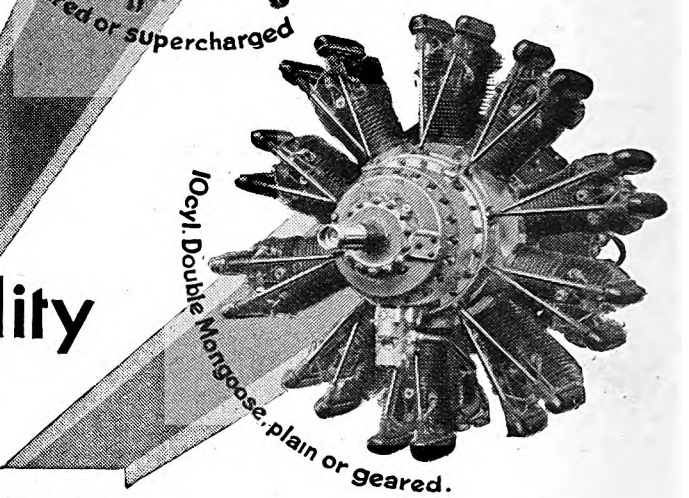


# Interchangeability of Parts

Interchangeable parts of the Jaguar, Lynx, Mongoose and Double Mongoose are the cylinders, pistons, auxiliary connecting rods, front cover, airscrew boss, hand starter and primer pump. Additional parts interchangeable on the Jaguar and Lynx are the oil pump, master connecting rod, gas distributor and timing gear.

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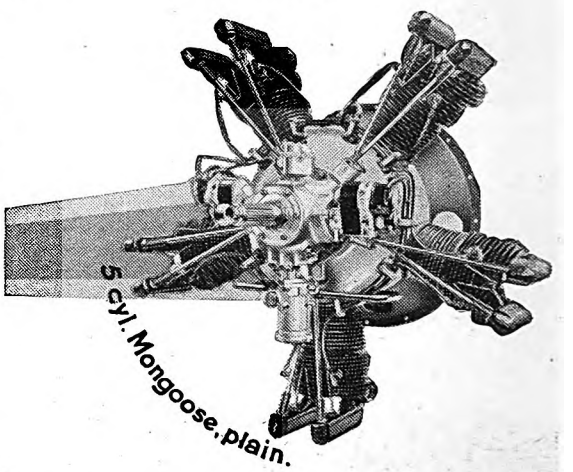


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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, December 19.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following are granted S.S. Comns. as Plt. Offs. on probation with effect from and with seniority of Dec. 5:—B. A. Casey, W. Dunne, E. R. S. Johnston, K. Lea-Cox, H. W. Marlow, A. H. Marsack, W. Pickersgill (Sub-Lt., R.N.R.), M. Sorsbie, H. L. Tancred, J. R. Wemyss, E. W. Whitley, F. W. Yates (Sec. Lt., The Duke of Wellington's Regt., T.A.).

Lt. E. O. F. Price, R.N., is re-attached to the R.A.F. as a Flg. Off. with effect from Dec. 9, and with seniority of Jan. 12, 1925. Flt. Lt. A. W. Bates is granted a Perm. Comn. in this rank (May 1).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—S. J. H. Carr (Oct. 2); D. W. Smythe (Nov. 22), E. Coleman, D.F.M. (Dec. 17).

Lt. H. D. Smallwood, R.N., Flg. Off., R.A.F., relinquishes his temp. Comn. on return to naval duty (Dec. 6); Flg. Off. A. O. Simpson (Lt., R.A.) relinquishes his temp. Comn. on return to Army duty (Dec. 8).

MEDICAL BRANCH.—M. Pearson, M.R.C.S., L.R.C.P., L.D.S., is granted a temp. Comn. as a Flt. Lt. with effect from and with seniority of June 1. (Substituted for the notification in the *Gazette* of Aug. 26); Flt. Lt. B. F. Haythornthwaite, M.B., B.Ch., is promoted to the rank of Squadron Leader (Dec. 19).

DENTAL BRANCH.—Major L. Somerville-Woodiwis, L.D.S. (Army Dental Corps), is granted a Perm. Comn. as a Squadron Leader with effect from Nov. 24 and with seniority of July 1.

CHAPLAINS' BRANCH.—The Rev. S. L. Clarke, M.A., B.Sc., is appointed Chaplain-in-Chief and is granted the relative rank of Air Commodore (Dec. 11); the Rev. J. I. Stuttaford is granted a S.S. Comn. as a Chaplain (Church of England), with the relative rank of Squadron Leader (Dec. 11); the Rev. R. E. V. Hanson, O.B.E., M.A., K.H.C., relinquishes the appointment of Chaplain-in-Chief, and is placed on the retired list (Dec. 11).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—J. S. Sheppard is granted a Comn. in Class A as a Plt. Off. on probation (Dec. 5); Flg. Off. C. C. Clark is promoted to the rank of Flt. Lt. (Dec. 17); Flg. Off. C. G. H. E. Lumsden is transferred from Class C to Class A (Nov. 9); Flg. Off. J. A. Ingles is transferred from Class AA (ii) to Class C (Dec. 7); Flg. Off. G. W. Smart is transferred from Class A to Class C (Nov. 10). The following relinquish their Comns. on completion of service (Sept. 12):—Flt. Lt. W. W. McConnachie, Flg. Off. A. E. Pitcher, M.M.

MEDICAL BRANCH.—Flg. Off. P. A. Carrie, M.B., is promoted to the rank of Flt. Lt. (Dec. 17).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON.—The following to be Plt. Off.:—M. F. Anderson (Nov. 4).

No. 605 (COUNTY OF WARWICKI (BOMBER) SQUADRON.—The Rt. Hon. the Viscount Bearsted, M.C., to be Honorary Air Commodore (Dec. 16).

CHAPLAINS' BRANCH.—No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—The Rev. W. B. C. Buchanan resigns his Comn. (Nov. 11).

## Appointments.

*Week ending* Dec. 22.

GENERAL DUTIES BRANCH.—Wing Commanders A. Shekleton, D.S.O., and R. S. Maxwell, M.C., D.F.C., A.F.C., to the R.A.F. Depot, on transfer to the Home Establishment, 2.11.30. C. F. A. Portal, D.S.O., M.C., to Air Ministry (D.O.I.), for Air Staff Duties, 15/12. R. H. Peck, O.B.E., to H.Q., Coastal Area. Attached to Air Ministry (D.O.I.), 15/12.

Squadron Leaders W. H. de W. Waller, A.F.C., to No. 33 Sqdn., Bicester, 15/12. H. V. Rowley, to No. 56 Sqdn., North Weald, 15/12. F. H. Laurence, M.C., to No. 3 F.T.S., Grantham, 9/12. G. D. Nelson, D.S.C., A.F.C., to H.A.D., Henlow, 6/12. D. E. Stodart, D.S.O., D.F.C., to the R.A.F. Depot, on transfer to the Home Establishment, 2/11.

Flight Lieutenants C. Walter, to No. 2 F.T.S., Digby, 11/12. T. G. Bird, to School of Army Co-operation, Old Sarum, 8/12. G. N. J. Stanley-Turner, to No. 13 Sqdn., Netheravon, 10/12. W. Sanderson, to R.A.F. Depot, Uxbridge, 8/12. G. V. T. Thomson, to No. 100 Sqdn., Donibristle, 6/12. J. E. W. Bowles, to A. and G. School, Eastchurch, 12/12. W. J. Seward, C. A. Horn, and W. H. Golder, D.S.M., to the R.A.F. Depot on transfer to the Home Establishment, 2/11.

Flying Officers I. G. E. Dale, to No. 47 Sqdn., Khartoum, 28/11. A. O. Moore, to Station H. Q., Heliopolis, 25/11. H. C. D. Hayter, to No. 24 Sqdn., Northolt, 6/12. R. C. Warner, to No. 30 Sqdn., Mosul, 10/11. C. Sarsfield-Sampson, to No. 84 Sqdn., Shaibah, 24/11. H. C. Marett, J. Marson, F. W. M. Wright, G. F. Overbury, A. C. Mitchell, J. C. Jeffrey, M.C., to the R.A.F. Depot on transfer to the Home Establishment, 2/11.

Pilot Officers D. W. H. Heath, to No. 55 Sqdn., Hinaidi, 15/11. H. C. O'Loughlin, to No. 3 F.T.S., Grantham, 5/12. J. G. Mansfield, to No. 9 Sqdn., Boscombe Down, 7/12. L. S. Lamb, to R.A.F. Depot, Uxbridge, 9/12. The undermentioned are all posted to R.A.F. Depot, Uxbridge, on appointment to short service commissions with effect from 5/12:—B. A. Casey, W. Dunne, E. R. S. Johnston, K. Lea-Cox, H. W. Marlow, A. H. Marsack, W. Pickersgill, M. Sorsbie, H. L. Tancred, J. R. Wemyss, E. W. Whitley, and F. W. Yates.

MEDICAL BRANCH.—Group Captain A. V. J. Richardson, O.B.E., to the R.A.F. Depot, on transfer to the Home Establishment, 2/11.

Flight Lieutenants P. B. L. Potter and G. W. Paton, to the R.A.F. Depot on transfer to the Home Establishment, 2/11.

STORES BRANCH.—Squadron Leader G. Stevens, O.B.E., to the R.A.F. Depot on transfer to the Home Establishment, 2/11.

Flight Lieutenants J. K. McDonald, E. A. Tottle and W. St. J. Littlewood, to the R.A.F. Depot on transfer to the Home Estab., 2/11.

Flying Officers F. W. Felgate, R. B. Brown and H. D. Jackman, to the R.A.F. Depot on transfer to the Home Estab., 2/11.

Flying Officer A. H. E. Frost, to Station Administration, Halton, 8/12.

DENTAL BRANCH.—Squadron Leader L. Somerville-Woodiwis, to R.A.F. Depot, Uxbridge, on appointment to a Perm. Comn., 24/11.

CHAPLAINS' BRANCH.—The Rev. S. L. Clarke, M.A., B.Sc., to Air Ministry (Dept. of A.M.P.), on appointment as Chaplain-in-Chief, 11/12. The Rev. W. P. Hughes, to R.A.F. Training Base, Leuchars, 2/11. The Rev. J. I. Stuttaford, to No. 1 School of Technical Training (Apprentices), Halton, on appointment to a S.S. Comn., 11/12.

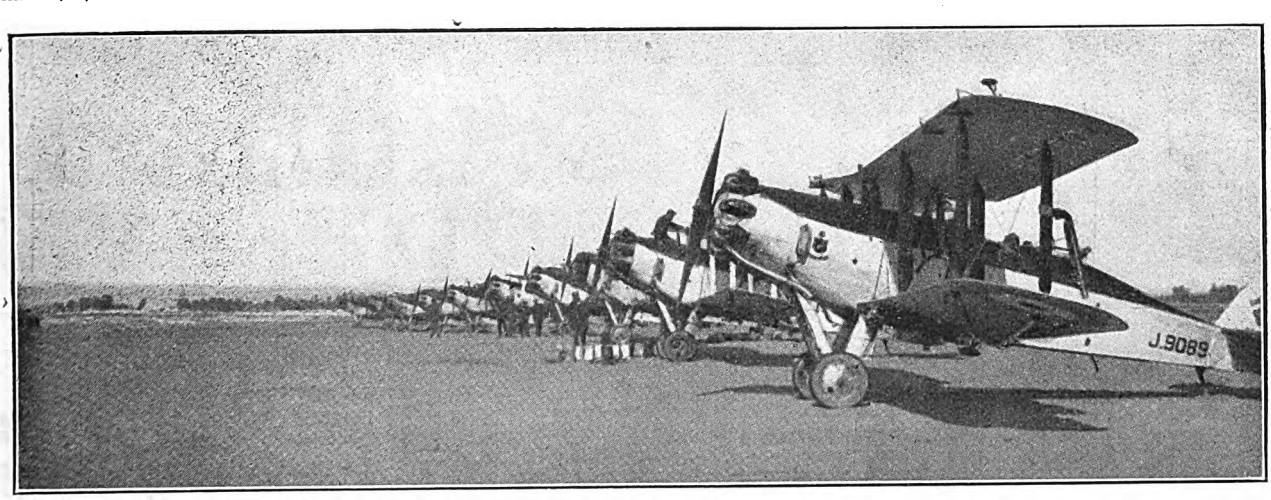
## Government Aircraft Orders.

In the House of Commons on Dec. 17, in reply to a question by Lieut. Cmdr. Kenworthy, the Under-Secretary of State for Air said that the recent Press statements that 250 aircraft of a new type had been ordered by his Department was not correct. No such orders had been placed.

## An African Trooping Exercise.

The 1931 Service flight to the Cape will leave Heliopolis Aerodrome, Cairo, on January 12 and will arrive at Capetown at the end of the first week in February. It will remain at the Cape for a few days and arrive back at Heliopolis about the middle of March.

The flight will be made by three Vickers Victorias of No. 216 (Bomber) Squadron, under the command of Sq. Ldr. H. W. G. J. Penderel, M.C., and will be accompanied by Group Captain E. M. Murray, D.S.O., M.C., representing the Air Officer Commanding R.A.F., Middle East. The other personnel of the Flight will be Flt. Lt. D. D'A. A. Greig, D.F.C., A.F.C., Flg. Off. C. E. W. N. C. Pelley, Flg. Off. J. B.




**"HIC ET UBIQUE":—Christmas greetings from No. 84 (Bomber) Squadron, Shaibah. The photograph shows the Squadron lined up at Jahra (Kuwait) ready for the air action which resulted in the surrender of Faisal ed Dawish. The aeroplanes are Westland Wapitis (Jupiter).**

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Knapp, Sjt. W. Manning, Sjt. R. Harding, Sjt. J. Harrington and five Aircraftmen.

The Flight will carry out troop-carrying exercises at Entebbe, Nairobi and Tabora on the outward journey.

**The R.A.F. Reserve.**

In the House of Commons on Dec. 17, in reply to a question by Mr. O. Lewis, the Under-Secretary of State for Air said that Mr. H. V. Michell had been transferred from the active list to Class A of the R.A.F. Reserve in September 1926. During the year ended Sept. 1, 1927, he had failed to carry out the necessary flying training as laid down in the regulations and had therefore not been eligible to receive the retaining fee.

**The Royal Air Force College.**

The Passing Out Inspection of Royal Air Force Cadets was held at the Royal Air Force College on Dec. 19 by Air Chief Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O.

The Commandant, Air Vice-Marshal A. M. Longmore, C.B., D.S.O., in his Report said that the organisation of the Cadet Wing had been altered in September from two squadrons to three.

Discipline has been good with the exception of one incident of bad behaviour outside the College in which two Cadets had been implicated. Severe disciplinary action had been taken and one of the Cadets had since been withdrawn from the College.

Of the 24 Flight Cadets passing out 11 had graduated on Fighters and 13 on General Purpose types They had averaged 39 hours flying on the selected Service type and 116 hours flying during their course. In the competition for the R. M. Groves Memorial Flying Prize each Squadron had been represented by two Cadets and for the first time in the last eleven competitions the prize had been won on a two-seater aeroplane—the Atlas.

Two serious aeroplane accidents had occurred during the term in which Flt. Cadet E. H. Fawkes and Flt. Cadet P. Berry had been killed. Both were in their third term and had flown over 60 hours. The causes of the two accidents appeared to have been similar. In each case there had apparently been a mishandling of controls on a turn made at a comparatively low altitude shortly after taking off with, probably, a failure to maintain the ample flying speed required by the Atlas in such circumstances. Further steps had been taken to emphasise these particular features of the Atlas by additional explanation and demonstration to all Cadets, and flying orders had been amended to prohibit pupils from making a turn on any type of aeroplane below one thousand feet after taking off

The institution of a Chief Flying Instructor in charge of all flying training had been successfully put into effect and had resulted in an improvement in the standard of flying training. The revised syllabus of ground training had reduced slightly the amount of time devoted to engineering in the Cadets' second year and the time gained had been distributed among such subjects as Airmanship and Air Force duties upon which as junior officers Cadets would be employed within a short period of leaving the College.

The instruction in the aircraft section during the term had been undergoing a transition from wooden construction of aircraft and carpentry to metal construction and the treatment of metals. Good progress had been made.

The "Maori" Cup presented to the Flight Cadet obtaining the highest score in the Miniature Rifle inter-Unit Shield Competition at Cranwell had been won by Flt. Cdt. M. W. S. Robinson, the present holder.

During the past term 56 Cadets had been admitted to hospital. Flt. Cdt. C. Goring had died as the result of a motor-cycle accident while returning from leave. Motor-cycle accidents had been increasing in number and severity and 84 working days had been lost in three months in consequence. A regulation had been instituted to deprive Cadets who had become casualties from this cause or who had been found guilty of careless or dangerous driving, of the privilege of keeping a motor-bicycle.

The standard of physical training and games had been good and this year Squash Racquets had been included in the Inter-Squadron Competition.

In the Inter-Squadron Competitions, "A" Squadron had won Rugger and Squash Racquets, "C" Squadron had won Soccer and "B" Squadron had won Skill-at-Arms.

The Sword of Honour, presented to the best all-round Flight Cadet in the senior term, had been awarded to Flt. Cdt Under Officer Henry Algernon Vickers Logan.

The R.M. Groves Memorial Prize, for the best all-round Pilot in the senior term had been awarded to Flt. Cdt. Cpl. John Patrick Cecil-Wright.

The Abdy Gerrard Fellowes Memorial Prize, for the Flight Cadet of the senior term obtaining the highest total marks in Mathematics and Science, had been won by Flt. Cdt. Sgt. Robert Travers Cazalett.

The prize awarded to the Flight Cadet in the senior term obtaining the highest marks in Humanistic Subjects had been won by Flt. Cdt Cpl. Fergus Alexander Pearce.

The prize awarded to the Flight Cadet in the senior term obtaining the highest marks in Aeronautical Engineering had been won by Flt. Cdt. Cpl. William Stanley Reed.

**The Training of Aircraft Apprentices.**

HALTON.

An inspection was held by Air Vice-Marshal H. C. T. Dowding, C.B., C.M.G., Air Member of Council for Supply and Research at No. 1 School of Technical Training (Apprentices), Halton, on the occasion of the Passing Out of the Seventeenth Entry of Apprentices on Dec. 16.

The Commandant, Air Commodore I. M. Bonham-Carter, C.B., O.B.E., in his Report said that of the 351 Apprentices passing out 141 had been trained as fitters (aero-engine), 189 as metal riggers, 12 as fitters (armourer), and 9 as coppersmiths and sheet metal workers. As a result of the final examination 37 Apprentices had been classified as Leading Aircraftmen, 266 as Aircraftmen (1st class) and 41 as Aircraftmen (2nd class)

The standard of drill and discipline of the Entry had been good and although physical training had been handicapped by the shortage of qualified instructors many successes stood to the credit of the Entry in the field of sport. The technical training results showed a strong average.

The Aero-Engine Fitters had been trained on the Napier Lion, the Siddeley Jaguar and the Bristol Jupiter, and each apprentice had specialised on one of these types. The Metal Riggers of this Entry had constructed one Short Mussel all-metal air frame from raw material and had almost finished a second. The standard of the Armourer Fitters had been well up to the high standard required. Two of the nine Apprentice Coppersmiths had passed the Central Trade Test Board as Leading Aircraftmen but had failed to qualify educationally.

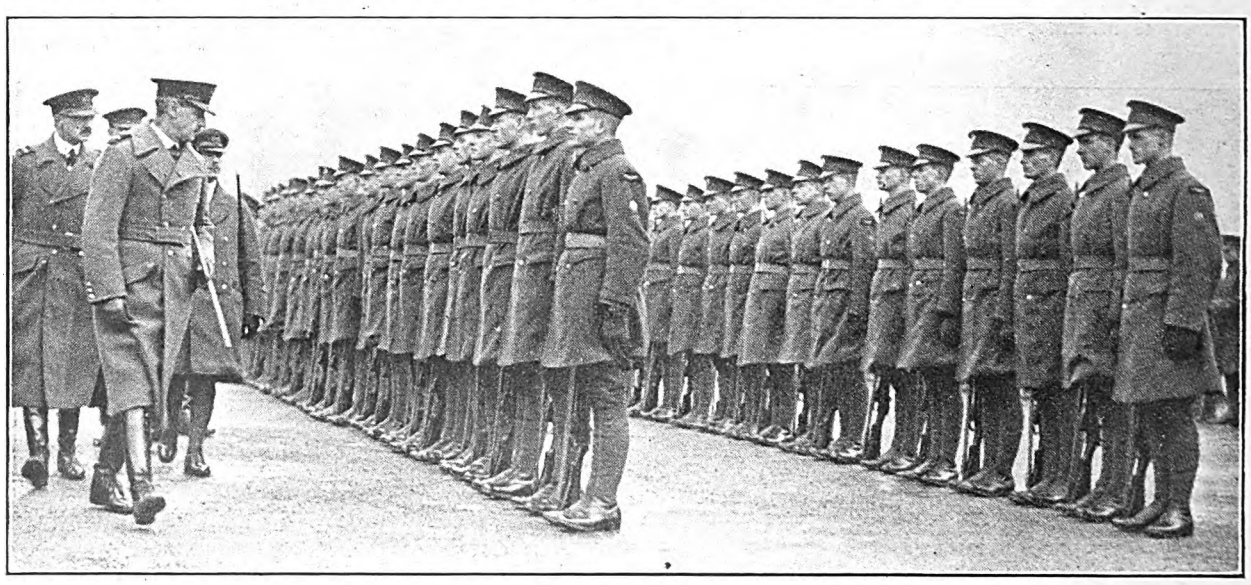
The educational standard of the Entry had been below average on its arrival at Halton but by special attention those who were at the bottom of the entry list had been brought along by easy stages and a good standard had been finally attained. Their industry had always been good.

Cadetships had been offered to E. G. J. Jacobs, S. P. A. Patmore, P. R. Robinson, J. C. Pope, M. K. D. Porter. The Sir Charles Wakefield Scholarship had been awarded to J. C. Pope. The Elliott Memorial Prize had been awarded to G. J. Armstrong.

The Air Ministry Prizes had been awarded as follows:—*Grand Aggregate*, 1st Prize, J. C. Pope; 2nd Prize, G. J. Armstrong. *Educational Subjects*, J. C. Pope. *Fitters, Aero-Engine*, 1st Prize, J. C. Pope; 2nd Prize, S. Allard. *Metal Riggers*, 1st Prize, E. G. J. Jacobs; 2nd Prize, R. L. L. McCullough. *Coppersmith and Fitter Armourer*, F. G. Tipping.

CRANWELL.

An Inspection was held by Air Vice-Marshal A. E. Borton, C.B., C.M.G., D.S.O., A.F.C., A.O.C. Inland Area, at the



**TECHNICAL TRAINING.—Air Vice-Marshal H. C. T. Dowding, C.B., C.M.G., Air Member for Supply and Research, accompanied by Air Commodore I. M. Bonham-Carter, inspecting Aircraft Apprentices at Halton.**

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**AUTO AUCTIONS LTD. of Burlington Gardens, W.1, are the World Distributors of the Blackburn BLUEBIRD light aeroplane. Agency applications invited. It was on a BLUEBIRD that the Hon. Mrs. Victor Bruce flew from England to Japan—11,000 miles.**



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Electrical and Wireless School, Cranwell, on the occasion of the Passing Out of the Thirteenth Entry of Apprentices, on Dec. 17.

The Commandant, Group Capt. A. L. Godman, C.M.G., D.S.O., in his Report said that 36 Apprentices were passing out. The discipline had been good and that the bulk of the minor offences occurred during the early part of the training.

The Technical Training results had been above the average and the Educational work had reached a good average. In the final examination of the Central Trade Test Board, 14 Apprentices had been classified as Leading Aircraftmen, 18 as Aircraftmen (1st class), 6 as Aircraftmen (2nd class) and none had failed. In the final examination in Educational Subjects 7 had passed with credit and 29 had qualified educationally for Leading Aircraftmen.

The Entry had shown great keenness in physical training and in games. The Unit had, since the August break, played 56 Association Football matches, 16 Rugby Football matches, 12 Hockey matches, and there had been 16 meetings of nine matches each of Boxing. There had been 109 swimming certificates gained this year.

The prizes offered by the Air Ministry and by Mr. Hyde-Thomson had been awarded as follows:—

*Highest Aggregate Prize*, T G. Woods *Technical Subjects*, T G. Woods. *Educational Subjects*: A. J. Hayward.

### Martlesham Entertains the Trade.

The Aeroplane Experimental Establishment, R.A.F., Martlesham Heath, held its eighth Annual Contractors' Dinner on Friday, Dec. 19. The idea of asking the constructors of British aircraft and the chief members of their staffs to dine at Martlesham and meet the test pilots and officials who try out their machines was instituted by Wing Cdr. N. J. Gill, C.B.E., M.C. (now Group Captain), when he commanded the station, and the idea has always been both pleasant and profitable. Under the influence of a thoroughly cheery social evening pilots are encouraged to tell constructors just what they think of their aeroplanes in a way which they would not venture to put into official reports, and contrariwise, contractors, and more especially their own tame test pilots, most of whom have themselves served at Martlesham at one time or another, can tell Martlesham quite a lot that it would never learn in official communications between their firms and the Air Ministry.

Group Capt. V. O. Rees, O.B.E., who now commands at Martlesham, after having given the Toast of the King, told us all how pleased he was to see the representatives of the constructors there again, and proposed the Toast of the Guests in a few well-chosen words.

The first speech in reply was made by Mr. C. R. Fairey, as President of the Royal Aeronautical Society, the oldest aeronautical organisation in the World, a fact which gave him precedence over Mr. Handley Page as Chairman of the Council of the Society of British Aircraft Constructors, although the guests primarily represented British aircraft constructors rather than the scientific side.

Mr. Fairey complained of having been given this precedence because it deprived him of the opportunity of profiting by the speeches of other people. Nevertheless he did very well without any preceders, and was particularly enlightening on the air-faring proclivities of Santa Claus.

On the serious side he explained how really valuable Martlesham Heath was to the progress of British Aviation. He laid particular emphasis on the fact that Martlesham performance figures were accepted in every country in the World as absolutely accurate, and said that in Belgium recently, although the Belgian figures showed a slight improvement on Martlesham figures, the Chief of the Belgian Test Section said that Martlesham figures were recognised as the criterion of aircraft testing throughout the whole World.

Mr. Handley Page gave us an impassioned oration on the important part which the British Aircraft Industry, especially that portion of it which held the true faith in the matter of slots, played in leading the World on the path of light and peace. And, incidentally, his mock heroics carried with them a sub-stratum of very sound sense.

Air Marshal Sir John Higgins, K.C.B., K.B.E., D.S.O., A.F.C., Chairman of Armstrong Whitworth Aircraft Ltd. and of A. V. Roe and Co. Ltd., who made his first appearance as a member of the Trade, took the opportunity of telling the personnel at Martlesham how highly he appreciated all the good work they had done for his Department when he was Air Member for Supply and Research.

Sir Robert McLean, Chairman of Vickers (Aviation) Ltd., said that two-and-a-half years ago he came into aviation, merely knowing that such things as aeroplanes existed, but that now looking at aeroplanes in the light of his experience as an operator of railway transport he had absolute faith in the future of air transport and had learned to appreciate the value of the Martlesham tests.

Air Commodore F. V. Holt, C.M.G., D.S.O., Director of Technical Development, expressed on behalf of the Air Ministry his appreciation of the work which Martlesham did, and said how much his department valued the personal touch which such an occasion as this produced between the constructors and the test pilots.

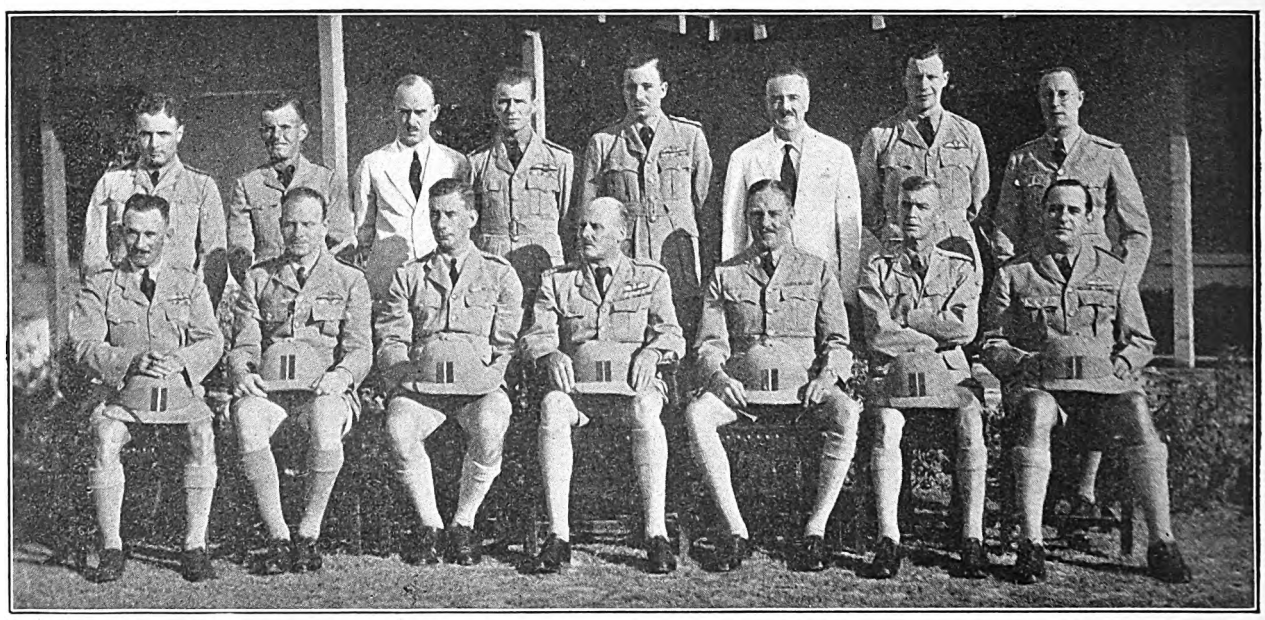
Mr. John Lord of Saunders-Roe Ltd. entertained the company with several of his inimitable Lancashire stories.

The Editor of THE AEROPLANE, referring to Air Commodore Holt's remark about the personal touch, said that he understood that in these days the personal touch between the pilots and the constructors on these occasions was not so close as it had been in the past. He gathered that playing Chinese Rugger, and Tanks, in the ante-room was not now regarded with favour and that the pilots were not encouraged to throw their guests out of the Mess. So evidently the personal touch was lighter than it had been.

He corroborated Mr. Fairey's appreciation of the value of Martlesham figures and said that a Martlesham Certificate was the Hall Mark of the best aeroplanes all over the World. He suggested that all the same the progress of aviation might be accelerated if civil aircraft were not obliged to undergo the Martlesham test. If some people wanted to build and other people wanted to buy cheap aircraft and were prepared to risk their necks in them he did not see why they should be prevented from doing so. Those firms who wanted to make the highest class civil aircraft would undoubtedly send their machines to Martlesham so that they might have the Martlesham Hall Mark, but the others might be allowed to conduct their business in their own fashion.

The Martlesham Padre concluded the proceedings by rising under protest and saying that making speeches was not his business, but that he liked being at Martlesham.

Thereafter the party dispersed to converse. The most



**THE 'IRAQ COMMAND:—The Officers of No. 2 Mess, 'Iraq Command, photographed for their Christmas card. In the middle is Wing Cdr. T. O'B. Hubbard, M.C., A.F.C., Station Commander, Hinaidi.**

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# SIMPLICITY—HENCE ECONOMY

ONE of the greatest drawbacks from which any mechanical contrivance can suffer is needless complication. In the design of the Moth, and in its evolution from the 1925 model to the 1931 model, simplicity has been held of the highest importance. The result is that every operator of a Moth—private owner, paid pilot, Air Force or Government Service—can maintain the aircraft in first-class condition by the sole exercise of the modicum of knowledge necessary to keep a motor car in good running order. *Skilled attention is rarely necessary.* This fact, coupled with the reliability and fuel economy of all Gipsy engines, substantiates the Moth's claim to be the cheapest aeroplane in the world to operate on serious and prolonged service.

# GIPSY MOTH

THE DE HAVILLAND AIRCRAFT CO., LTD., STAG LANE AERODROME, EDGWARE, ENGLAND




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exciting entertainment was provided by Mr. Leslie Irvin of parachute fame who gave an exhibition of playing the piano while standing on his head on the floor, and also of drinking a glass of beer while standing on his head.

Mr. Handley Page also entertained the company, including Mr. Irvin, who himself is a brilliant conjuror, with card tricks. Perhaps his most appreciated trick was demonstrating that though his trouser pocket held nothing, which he assured us was the common state of aircraft constructors, he was able to produce diamonds from it, and that when everybody saw him put the ten of diamonds into his pocket it came out as the nine, which, as he explained, gave him a reasonable profit of 10%.

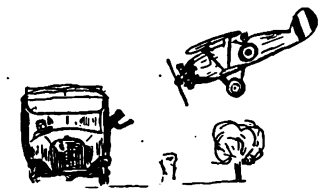
Altogether it was a very amusing evening.—C. G. G.

**Petrol from Coal.**

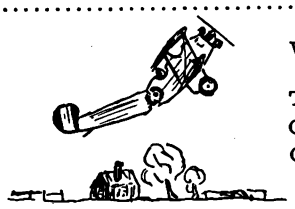
In the House of Commons on Dec. 17, in reply to a question by Lieut. Cmdr. Kenworthy, the Under-Secretary of State for Air said that laboratory and preliminary engine tests had been made on samples of petrol produced from British coal by two independent processes with satisfactory results. The fuel was now being tested for stability under storage conditions such as would be encountered if it were adopted for general use in the R.A.F. He did not think that the petrol had been used in actual flying, but it had been used in engine tests and was at present in the laboratory stage.

## VICIOUS VERSES FOR CALLOUS CADETS.

*(Contributed by Cranwell.)*

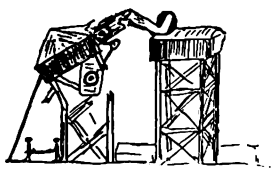


Percy pooped the rowing bus:
Squadron Leader made a fuss:
Percy's gone off home by rail
Good! We'll have an auction sale.



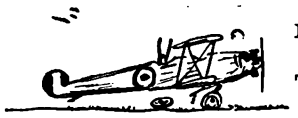
Whilst stunting in his Avro Lynx
The fuselage developed kinks*
Our Bertie never noticed this
Oh, how his funny jokes we miss!

Just above the hangars friskin'
Freddie in a metal Siskin
Charged a wall and pushed it through
Now poor Fred's all metal too.



Augustus was a trifle "ham"
(His father used to drive a tram)
His evolutions with the stick
Gave his instructor quite a "kick"
Until he hit the water towers—
G.S. tender—Mark III Flowers.

Just by the duty pilot's hut
A careless 9a hit a rut
The fire brigade arrived too late
And now the ashes lie in state.



Horace coming in to land
Found the ground too close at hand.
He threw his hands above his head
Thus emptying another bed.

* NOTE:—Poetic licence. They do not do such things.

**OUT OF THE BLUE:—Father Christmas distributing gifts at a Service Station in the Middle East.**

## THE DANISH ROYAL AIR FORCE.

In 1928 The De Havilland Aircraft Co. Ltd. supplied to the order of the Danish Government ten Gipsy Moths for the training of the Danish Royal Air Force and Naval Air Service. A contract was received on Dec. 17 for three more metal-fuselaged Gipsy Moths to augment this fleet.

## A CHILEAN GIN-KANA.

In September the Chilean Army Air Force held a flying contest and "Gin-Kana" (*anglicé or Hindostané* Gymkhana) at the airport of Los Cerrillos, Santiago. The machines used in this contest were Gipsy Moths, which type is used as the standard training machine by the Chilean Army.

The contest comprised the following events:—

1. A 1,000 km. circuit by way of Curico, Cauquenes, Los Angeles, Linares and back to Santiago,—points awarded for flying time and petrol consumption.
2. A landing contest,—competitors to descend from 1,000 m. with airscrew stopped and land within a 50 m. circle.
3. A "Gin-Kana," in which competitors had to tow their aeroplane 100 m., start their engine, take-off, land in the vicinity of a "goal," fold their wings, push the machine through the "gaol," open out their wings, start their engine, take-off and make two circuits of the aerodrome, land in the vicinity of a control and sign a book, take-off again and make one circuit of the aerodrome and then land at the finishing point.

For the landing contest and the "Gin-Kana" a maximum of 100 and 50 points respectively were awarded.

Teniente 1o. de Aviacion Fernando Ortega was first in the entire contest with 490 points and Teniente 1o. de Aviacion Roberto Costabal was second with 460 points. Ten officers competed and completed all the tests.

The first prize of $20,000 was presented by Señor Merino Benitez, the Under-Secretary for Air, and the second prize, an *Objet d'art*, was presented by Señor Marcos Serrano.

## AEROPLANE POSTCARDS.

Two sets of "Aeroplane" postcards are now available and may be had on application to the Photographic Department, THE AEROPLANE, 175, Piccadilly, W. Set "A" consists of the Sidestrand, the Hart, the Bulldog, the Wapiti, the Fairey IIIF. and the Horsley. Set "B" consists of the Fury, the Firefly, the Ripon, the D.H. Intercepter, the Gnatsnapper and the Fox.

Each machine is flying. The postcards are 2s. a set post free.

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# DE HAVILLAND

*officially approves*

# STANAVO

## AVIATION OIL

## for GIPSY engines

The following striking data are from the report of an official test with a De Havilland Gipsy Engine:

Engine ran 50 hours at full throttle at 1,930-1,940 r.p.m.

Oil temperature during test was between 50°C. and 55°C.

Oil pressure was 40·42 lbs. per square inch.

After this severe test, piston rings and pistons were in good condition, the carbon formed was easily removed and the oil filter was satisfactorily clean.

STANAVO

*Marketed in Gt. Britain by the Anglo-American Oil Co. Ltd.*

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## THE LOSS OF THE R.101.

The inquiry into the loss of the airship R.101, which was adjourned on Nov. 10, was resumed on Dec. 3.

Sir John Simon explained that the Court had been adjourned so that certain investigations might be made. We gather that the date for the adjournment had been fixed before to suit previous engagements of those concerned.

The Solicitor-General said that he would like to state personally, as representing the public, that every possible document which could have any bearing on the matter had now been placed before the Court. One of the documents he produced was a letter from Col. Richmond of Oct. 24, 1929, regarding the construction of the metal work of the airship and giving a table of excess weights. There was a total excess of about 14½ tons over the calculations. Savings in weight had been effected by taking out certain items.

Sir John Simon said that three tons had been taken out and another three tons added.

The Solicitor-General said that another document contained notes on the policy of the Air Ministry regarding the flight to India and experimental work.

Sir John Simon read an extract from Lord Thomson's speech in the House of Lords during the debate on civil aviation this year in which Lord Thomson had emphasised on the experimental nature of the airships and had added that no risks were going to be taken with them while he was in charge.

Flight Coxswain T. Greenstreet (chief coxswain of R.100) said that on April 22, 1921, he was acting as steerage coxswain of R.33 on a flight from Pulham for compass correction and when the ship was at 2,000 ft. it was reported that No. 13 bag in the aft part of the ship was losing gas. A rigger was sent with the chief coxswain to inspect the bag, but before their report came back to the control room the rigger fell and tore a large rent in the bag which rapidly deflated. The ship dropped by the tail. The helm was put hard down [This presumably means that the elevator flaps were pulled hard down to raise the tail. The phrase must not be confused with putting the helm hard down (or alee) on a sailing ship.—ED.] the engines were revved up and ballast was discharged. This brought the ship to an even keel. The drop was about 500 ft.

Sir John Simon said that the report of the captain on this incident was that the ship assumed an angle of 30 degrees. He would like to know whether when a large quantity of gas escaped at one end of the ship, with the result that she took a steep angle, the hydrogen was kept to some extent inside the outer cover and mounted to the other end of the ship and increased the tilt.

The Solicitor-General said that was the position so far as he could gather. Until the ship was on a level keel again the hydrogen would not escape from the outer skin. [Few outer envelopes are so perfect as to be seriously gas-tight,—one imagines.—ED.]

Sir John Simon said that he imagined that in R.101 there was a rapid escape of gas from some forward gasbag and she went down by the nose, then that free hydrogen may be supposed to have travelled up to the tail and increased the amount of the tilt.

Sir John Simon said that there was another entry in the log of R.33 that afterwards the ship rose 600 feet above pressure height before the ascent could be checked. Apparently she went to 3,100 feet before she could be controlled.

Mr. A. E. Gearish, shed manager at Cardington, said that he was responsible for gassing the ship when she was in the shed. The ship was handed over to him after the padding had been done and the holes in the gasbags mended and she then had 3,881,063 cubic feet of gas. During a period of about two months 4,226,400 c.f. of gas was issued to the ship. When she left his charge she had 5,236,163 c.f. of gas. Some had been used for specific purposes, and deducting that there was a loss of gas unaccounted for of 1,467,960 c.f. Mr. Gearish agreed with the Solicitor-General's suggestion that there had been an average leakage during 24 hours of 22,588 c.f. at a time when the ship was in as good condition as could reasonably be expected as regards leakage of gas.

Mr. Gearish said that there was a recognised percentage of loss of gas due to permeability of skin and valve leakage.

Sir John Simon said that reports showed that R.100 was losing 78,000 c.f. a day before leaving for Canada and 80,000 c.f. a day after she came back. Sq. Ldr. Booth said that the specific use of gas before R.100 went to Canada would reduce the 78,000 c.f. to between 50,000 and 60,000.

Mr. Disley, recalled, said that before the flight to India started he noticed that one of the gasbags was relatively high, perhaps to the extent of 18 ins. or 2 ft. That was about ten minutes before the ship left the mooring mast.

Sir John Simon said that Mr. Leach had revised his estimate of the time occupied in the first dive taken by R.101. He had said in evidence that it was about 45 seconds, but after checking by someone with a stop watch he thought it was about 15 seconds.

Professor Bairstow was recalled and gave details of experiments on a model of R.101 in the wind tunnel at the N.P.L. and a series of calculations asked for by Sir John Simon. Replying to Sir John Simon, he said that taking the accurate figures as worked out with the help of the new model the insertion of the new bay did not materially affect the previous stability of the ship.

Four lots of calculations were asked for by the Court. The first were for the least angle of pitch which would be experienced in various assumed conditions of gasbag deflation in the air, but not moving, and making the most favourable assumptions concerning the use of ballast to recover equilibrium.

Professor Bairstow said that with any gasbag in the forepart of the ship deflated completely, by dropping water and oil, and by redistributing what was left, this ship could be kept on an even keel when stationary. If any two adjacent gasbags completely deflated, the horizontal trim of the ship could not always be maintained, whatever was done with the ballast. It could be done if the two most forward gasbags and the two nearest the centre of the ship were concerned.

If gasbags 6 and 7 were concerned after all had been done that was possible, the ship would be 7 deg. down by the nose. With gasbags 3 and 4 deflated, the ship would be down 33 deg. or 34 deg. by the nose, with 4 and 5 deflated, 38 deg., and with 5 and 6, 24 deg. or 25 deg. If any two adjacent forward gasbags were half deflated, horizontal trim could be maintained by dropping fuel and redistributing what was left.

Apparently there was rather a large difference between these two instances and intermediate instances, in which three-quarters of any two adjacent forward gasbags were deflated. Then horizontal trim and equilibrium could be maintained for gasbags 1 and 2, 2 and 3, 6 and 7, and 7 and 8. With gasbags 3 and 4 three-quarters deflated, there would be a residual dipping of the nose of 6 deg., with gasbags 4 and 5 of 11 deg., and of 5 and 6, 5 deg.; so that by dropping fuel and ballast and redistributing what was left something just a little less than 1½ forward gasbags deflated, or three-quarters of two adjacent gasbags deflated could be handled.

Sir John Simon suggested that gasbags 4 and 5 were those which gave the most extreme consequences. He asked what time was required to pump ballast from one part of the ship to another?—Professor Bairstow said he thought about 10 minutes, but Sq. Ldr. Booth, when asked, said he understood that 20 to 25 minutes would be needed.

The second set of calculations assumed that the ship was being propelled horizontally through the air at 55 knots. Professor Bairstow was asked to assume loading, ballast, stores, crew, passengers, etc., in accordance with the conditions at the time of the disaster; to take the conditions of gasbag deflation assumed in the first question, and to calculate what inclination of the elevators would be needed to maintain the presupposed steady, horizontal flight, if such a condition could be maintained after those various assumptions; there being no time to move or drop ballast.

Professor Bairstow said the estimate taken as the basis for these calculations, and made on the old model of the ship, was that the ship was four tons heavy, because of rain. The conclusion was that if 55 knots could be maintained there was enough aerodynamic moment from the elevators and enough dynamic lift to deal with any one gasbag forward being completely deflated. He was not quite sure about two forward gasbags. The condition was unreal at a high angle of pitch, because the speed could not be maintained at 55 knots.

Sir John Simon suggested that if, to counteract the loss of lift due to a forward gasbag being deflated you had to pitch the nose of the ship up more than before, then, though the engines might run at the same number of revolutions, the vessel would no longer be advancing through the air at 55 knots, so that, while the engine record would show that she was travelling at full cruising speed, she would not really be travelling at that rate, because more and more her nose had to be put up to use aerodynamic force to maintain herself where she wanted to be?—Mr. Bairstow assented.

The third set of calculations assumed that the ship was moving, relatively to the air, on some angle downwards, and repeated the former assumptions with regard to gasbag deflation. Professor Bairstow was asked to calculate the pitching moment for any given angle; and what inclination of the elevator was required to balance this pitching moment.

He said he had the old model results of the maximum pitching moment which could be exerted by full use of the elevators at 55 knots, with various inclinations of the airship. With the airship pitching nose down 20 deg., the calculations gave a restoring pitching moment of rather more than 5,000 tons feet. Leaving out intermediate pitch angle, and coming to the horizontal position, if the pilot at that moment could get his elevators full up, the pitch moment would be a little over 3,000 tons feet; and if the ship was pitched up by the nose to the extent of 20 deg., the pitch moment was very nearly 3,500 tons feet. The pitch moment due to deflation of any one forward gasbag would tend to put the nose down in the worst case with a moment of 2,500 tons feet.

Sir John Simon.—That shows this: Always assuming that the speed of 55 knots could be maintained, the elevators of the R.101 would be sufficiently powerful to restore the control of the airship against the deflation of any one forward gasbag, whether she was down 20 deg., whether the ship was horizontal, or whether her nose was up 20 deg?—Yes.

That is without dropping or shifting any fuel?—Yes. Professor Bairstow added that starting with 55 knots, at no angle of pitch and no elevator angle, the speed was reduced to 50 knots by 5 deg. pitch; to 43 knots at 10 deg., and to 30 knots at 20 deg.

Sir John Simon.—Is that assuming that the ship itself is moving horizontally, though the nose of the ship is pitched up or down; you are not assuming that the ship is rising or falling?—No.

If there is a progressive reduction of speed of that sort it would, of course, have an effect on the dynamic lift of the airship, and there must come a point, must there not, when it would be impossible to maintain horizontal flight? Is it possible to work out in the case of R.101 how far you have to go before that result follows aerodynamically?—The maximum total dynamic lift you get from R.101 with that engine power is a little in excess of 13½ tons.

When you get past this cardinal point, the centre of gravity of the thing will begin to come nearer to the ground?—Yes.

And, in addition, the nose will begin to fall. Assuming that for any cause, whether general deflation or local deflation, the airship becomes heavier than 13½ tons, I understand that it must descend, and your calculations go to show that it would almost certainly descend nose downwards?—Yes.

Supposing that what actually occurs is, more especially, local deflation in the fore part of the ship. What difference does that make?—Assuming the maximum possible use of elevators, the ship starting initially four tons heavy, and at a speed of 55 knots, I have considered the effect of any one of the forward gasbags deflating progressively. Gasbags 3 to 8 will give pitching moments greater than can be dealt with by the elevator by the time they are 60 or 70 per cent. deflated.

Professor Bairstow drew various diagrams on a blackboard to

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illustrate his arguments. Sir John Simon said that a gust or lull would seem to have the effect of making it more difficult for the man in control to apprehend what was happening and that a smaller amount of deflation, or a smaller angle of pitch, might produce the extreme condition Professor Bairstow had been analysing. Professor Bairstow agreed, and said that a lull might turn the scale towards disaster.

Replying to Sir John Simon, Professor Bairstow said that he had not taken into account any allowance for the possible phenomenon that when the gasbag deflated, the hydrogen, instead of escaping at once into the outer air, remained to some extent inside the covering and might move to the other end of the cover. If the gas escaped rapidly he would say that it would be a reasonable hypothesis.

The Solicitor-General.—At the moment when the ship has got its nose up, assuming an escape of gas, if the gas gets into the nose from No. 4 bag, would not that tend to accentuate the upward tilt and therefore bring it nearer to the critical angle more quickly?—In the sense that it would help the ship to lose speed, yes.

Suppose R.101 had been travelling heavy and getting gradually heavier, with her nose pitched slightly up, and suppose there had been a gradual but rather rapid escape of gas from one of the forward bags, and the point had been reached at which the nose began to drop and the coxswain then put his elevator hard up to try to correct that drop, you would then for a short period have had a dive?—I think the ship would begin to fall bodily first.

If the coxswain then put his helm up and the escape of gas was not too rapid, he would be able to correct that in the initial stages?—Temporarily.

He would then at the bottom of the dive turn and start rising again?—Yes, if the period of the dive was not too long.

Immediately he started rising again the fact that he had the elevator up to the full extent would bring him more quickly to the critical angle?—Yes.

As soon as he reached that critical angle he would fall again and dive without possibility of recovery?—Yes, but partial recovery might, of course, be helped by the dropping of fuel.

That is subject to there not being a lull or gust or any disturbance in the atmosphere at the critical time?—Yes.

The Solicitor-General said, in reference to the loss of gas from R.100 before and after the Canadian flight, it had now been ascertained that, eliminating one bag, which lost 22,000 cubic feet a day, the loss before starting from Canada was 45,000 cubic feet. After the ship returned, eliminating another bag, which was then losing 21,000 cubic feet, the loss was 43,000 cubic feet.

Sir John Simon then contradicted what he said were two prevalent rumours. One was that Miss Spooner was on board the airship during its last flight and the other was that some of the crew were not sober when the airship started and that a quantity of intoxicating liquor was taken on board. Sir John Simon said that there was not the slightest truth in either of these rumours.

Dr. Hugo Eckener, President of the Zeppelin Company, said that he had read the evidence given at the first ten sittings and had also examined Professor Bairstow's calculations. He had prepared a statement which read as follows:—

"The extremely interesting and clear statements given yesterday by Professor Bairstow based on the experiments made in the wind tunnel clearly show that by assuming certain losses by gas it would be impossible to prevent an airship of the R.101 type from stranding in a trim and loaded condition, as was the case with the R.101 immediately prior to stranding, unless there be for instance sufficient time to retrim the ballast.

"Professor Bairstow, in my opinion, has dealt in a most convincing manner with all the factors determining the pitch moment. I particularly agree with him that the elevator is rendered ineffective when the ship comes into certain out-of-horizontal position, and also that heaviness of 13 to 15 tons is the maximum which can be carried dynamically. Yet I was somewhat surprised by the factor of pitching moment which he used for the effectiveness of the elevator. It is about double that which we calculate for the *Graf Zeppelin*. For this ship the pitch moment is only about 2,000 foot tons in the event of the ship flying heavy in horizontal position: that is, this would apply only by assuming that it is at least 10 tons heavy."

Dr. Eckener went on to say that Professor Bairstow used a figure of more than 3,000 foot tons. The trim moment of the elevator alone in the *Graf Zeppelin* was only about 1,000 foot tons at an angle of 25 deg. up or down. He admitted that he did not know exactly the moment of the R.101, but were the figures of the two ships similar it would be impossible to keep the ship in a horizontal position if she had a loss of gas of about 1,200 foot tons pitching moment, assuming the total heaviness to be six or seven tons. This position would be brought much nearer if the speed of the ship, as no doubt it was, had been reduced to two-thirds by then, thus reducing the effectiveness of the elevator to only one-half.

This would seem to be of value only from a theoretical point of view, but taking into account that the ship was heavy as a whole and nose heavy and could not keep, or could only temporarily be brought back to, a horizontal position, one had to imagine a process of straining in which the pitching moment might become effectively a question. Dr. Eckener continued:—

"In forming my opinion I commence with the fact that the ship made a sudden and very steep dive and that, in spite of the probable dropping of ballast, she could no longer be kept on a level keel, although she had been able up to that moment to hold her altitude. It lies very near at hand to connect sudden occurrence of head heaviness with the particularly steep dive, because the steep dive itself can hardly be explained by the sudden loss of gas, because the fact of a rent in one of the foregasbags would not show itself suddenly.

"The whole happening was no doubt as follows. At 2 o'clock the new watch came on to take over the control of the elevator. He (the coxswain) would have to feel his way into the static condition of the ship. This is an old experience. The weather was bumpy and the ship probably not only heavy—three or four tons—but a little heavy by the nose owing to the loss of gas in one of the forward gasbags, in the same gasbag which later sustained a large rent. It is very difficult at once to feel the head heaviness of the ship when the ship is heavy as a whole at the same time, because the static and dynamic factors would then compensate one another. It may now have happened that in a slight gust of wind the ship made a movement downwards which the new coxswain of the elevator did not immediately and correctly counteract because he could not be quite clear about the condition of the ship.

"The movement became steep because the ship now received a current of air from above onto her nose, thus accentuating the effect of the head heaviness. Gas between the gasbags and the outer cover escaped to the tail part of the ship, thus increasing the pitch movement still further. Owing to this unusually violent movement of the ship the already damaged gasbag received a large rent from which the gas now quickly escaped, going into the tail. Thus it took some time (perhaps fully 30 seconds) to bring the ship back to a level keel.

"Probably—and on this point I agree with Professor Bairstow—this was possible only by dropping oil from the control car. This oil came to lie under the stranded ship owing to the fact that the vessel, through her reduced speed in the strong wind, was making very slight way over the ground, which I estimate at four to five miles an hour. The ship having righted herself through the throwing out of ballast was unable to maintain her horizontal position by reason of the fact that the gas continued to escape quickly."

Sir John Simon.—At the moment, as you reconstruct the position, do you consider that people in the control car would know that they would be going down?

Dr. Eckener.—Of course. Therefore they would stop the engines.

Replying to another question by Sir John Simon, Dr. Eckener said his reference to a pitching moment of 1,200 foot tons and a heaviness of six or seven tons applied to the *Graf Zeppelin*, and he used it as an illustration. He thought the R.101 would be three to 3½ tons heavy because of rain and because of the loss of gas due to the ship going above pressure height at the start. He assumed that when the ship got back to horizontal by dropping ballast she lost speed, and also continued to lose gas. As a result the elevators could not do what they could have done before. The elevator moment, the pitching moment, was reduced to about half.

Sir John Simon asked whether in his view those in charge of the ship, after putting up the elevators and getting the ship horizontal, would begin to realise that they could not keep her horizontal, and Dr. Eckener said that they might have done so a little earlier. He thought it must have been very difficult for the commander to decide to drop oil because he needed it before he got to Egypt. He himself would have waited at least 12 or 15 seconds hoping to put himself right. If the commander came to the conclusion that the ship must go to earth he could only stop the engines in order to reduce the severity of the blow. Dr. Eckener said that he thought the cause of the fire was a broken electrical wire.

Wing Commander Cave-Browne-Cave said that it would be difficult to get much flame from the calcium containers unless a large number were broken completely open and came in contact with water which seemed an improbable combination of circumstances.

Replying to Sir John Simon, Dr. Eckener said that a hydrogen-borne airship could strike the ground violently without catching fire as it had happened often during the War. He was not sure whether a leaky gasbag would increase the probability of fire, but if the gas was escaping and mixing with the air and there was also a short circuit all the possibilities of explosion would be present.

Replying to Lieut.-Col. Moore Brabazon, Dr. Eckener said that he had expressed the opinion several years ago that the use of helium would become essential if airships were to be used for commercial purposes. The next airship Germany built would use helium.

Dr. Eckener said, in reply to further questions, that he considered a leakage of 50,000 cubic feet of gas per day from the R.101 abnormal. The *Graf Zeppelin* would not lose more than 7,000 or 8,000 cubic feet when in the shed. They had never found holes in the gasbags due to chafing. After the airship's trip round the World the leakage was about the same as when they started. Last winter the airship was in the shed about four months without being reinflated. The gasbags were practically airtight.

Squadron Leader Booth recalled, gave a detailed account of Flt. Lt. Irwin's Service career and experience. He said that he had served under him for two years and had known him for fifteen years. He was an efficient and capable airship officer who was exceptionally good at handling an airship in the air and also in the general organisation and efficiency of the crew. He took his duties as captain of R.101 very seriously and was very careful and thorough in the manner in which he flew the ship. The witness also said that he had a great opinion of Lieut. Cdr. Atherstone's efficiency and was sure that he had inspected the ship to the best of his ability before the last flight. Flt. Sgt. Hunt was one of the best airship coxswains in the Service. So far as the direction and competence of the crew was concerned the airship was well found. With regard to the incident when Commander Atherstone took the wheel over the Channel the witness said that he thought it tended to show that the flight-coxswain was perhaps rather careless in maintaining the height at 1,000 ft. over the Channel. There might have been difficulty in keeping the height.

Replying to Sir John Simon, Sq. Ldr. Booth said that the general attitude at Cardington was towards a progressive development of airships. He had always felt that R.101 was rushed as regards her trials by the influence brought to bear. She had been rushed out of the shed for the Hendon flight, he believed against Cardington's recommendation, and he was sure that she would not have been flown to India if the Imperial Conference had not been taking place. He would not regard Wing Cdr. Colmore as willing to take risks.

He added, that generally speaking, he agreed with Dr. Eckener's views. He had always had the opinion that something definitely happened to the ship. The general conclusions that had been arrived at by Captain Meager and himself were as follows:—They considered that the ship was flying at 1,500 feet, more or less normally just prior to the accident. At 2 o'clock everything was normal, otherwise the watch would not have been changed. She might have been four tons heavy. Before he heard Dr. Eckener's evidence he thought that something probably happened to the ship when flying at 1,500 feet, and he thought that possibly the steep dive into which Dr. Eckener suggested

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she might have got into after changing the watch might have been the cause of that something happening.

The ship was then, possibly by using full-up elevator, pulled out of her first dive, but the gas continued to escape, and the ship, getting heavier forward, might have been put into her second dive in spite of ballast being dropped, so that at the last moment the engines were slowed down to reduce the force of impact. He thought it would take some few seconds for the officer of the watch to realise that an emergency was happening. The ship had been used to flying pitched up and down from 3 deg. to possibly 10 deg. For the first 10 deg. the officer might have considered that it was merely a normal dive, possibly occasioned by the conditions he had been experiencing during the last three hours. This would be wasted time; the ship would be getting into an unmanageable condition before he realised that he had to take action. It could not be assumed that the moment the ship started putting her nose down in this first dive action was taken.

Replying to Sir John Simon, Sq. Ldr. Booth said that he thought that they must have known when flattened out that the ship would probably hit the ground. Normally speaking, coming out of a steep dive in which considerable height had been lost, the ship would be pulled up with a large angle of elevator; that angle would be kept so that she would come up with a steep climb in order to regain height. If it was seen that, in spite of this excessive use of elevator, the ship appeared to be only slightly coming out of the dive, and did not appear to be continuing her upward path, it would be known immediately that it was hopeless.

All that the navigator could do was to report, although the officer of the watch had probably noticed it at the same time; and they must have realised then that, with the ballast gone, the elevator hard up, and the ship horizontal, there was nothing more to do except to send a man, as a last chance, to release ballast forward. After that, if he saw the nose falling again, he must slow down the engines to attempt to decrease the force of impact, and possibly turn the airship's head to the wind, if there was time, which there was not in this case.

He did not see why the navigator should realise that a rapid loss of gas was going on. [That being so there is evidently a need for an instrument which will indicate immediately any rapid loss of gas in any gasbag.—ED.]

Discussing the cause of the fire, Wing Cdr. Cave-Browne-Cave said that the circumstances described were consistent with the ignition of a very rich, or a very weak, mixture of hydrogen, than of a petrol mixture.

Replying to the Solicitor-General, who asked about the training of the crew, Sq. Ldr. Booth said,—"I think that the training period had undoubtedly been cut short in the same way as the trials of the ship had been curtailed from the original programme, but the ability to meet an emergency in an airship is really not so much dependent on the airship in which you are flying as on your previous experience in airships of more or less the same type. The men who have to meet this emergency are not the crew generally, but the captain and officers of the watch and the men on the elevators.

"Major Scott, who was actually in charge of the flight, was the most experienced airship pilot in the country. His experience dated back to 1917, when he commanded the first British rigid airship R.9. Flight Lieutenant Irwin's experience I detailed yesterday. The chief coxswain, Hunt, I think is admitted to have been the most experienced airship coxswain in the country, although of course he was not at the time on the elevators. The two other coxswains had had considerable airship training and experience."

Replying to further questions, Sq. Ldr. Booth said that there were three assistant coxswains on board. Two were for watchkeeping and the third was carried for special duties and for mooring-tower routine when the ship arrived in Egypt.

Further, Sq. Ldr. Booth said that there had been some cutting down of the crew on board in view of the importance of not carrying unnecessary weight. No training on the ground could be given in the handling of airships, but a dummy wheel had been rigged up at Cardington for instruction in steering. The men picked up steering very quickly. Airships were easier to steer than sea ships. He agreed that on the change of watch the ship generally speaking did not keep such accurate height as when a man had had time to accustom himself to the condition of the ship. The effect would be more pronounced in bumpy conditions.

Replying to Sir John Simon, the witness said that he thought that the height coxswain going off duty would stand by the man taking over for two or three minutes to see that he had the correct feel of the ship.

Mr. W. E. Woodward, a member of the Iron and Steel Institute, described a number of tests which he had made with the broken cable and a new cable from Cardington, and said that the conclusion he had reached was definitely that the break in the cable had occurred after the accident. Major Cooper agreed.

Mr. Disley, recalled, said that there were two electric generators. Just before the crash he cut off one and in his opinion the bumping in the fore part of the ship would cut off the other. Then there would be no electric current in the ship.

Sq. Ldr. Nixon, officer in charge of organisation at Cardington, said that the general conclusion of the flying staff was that there would be much more difficulty in coming back from India than to go there.

Replying to Sir John Simon, the witness, referring to a document showing the estimated fuel requirements on the England—India route, said:—"May I say in the first instance that this document was got out at the instigation of Wing Commander Colmore? As a matter of fact he carried this document about with him in his bag, and he was always referring to it. When discussing the flight with Wing Commander Colmore he referred to the possibility of not having favourable conditions for the return journey, and he told me that Scott would have to satisfy him that the conditions were favourable before he would sanction the ship leaving Karachi. He said that he would run no risk whatever, and that it did not matter even if the Secretary of State brought pressure to bear upon him. If he was not satisfied he would not approve of the ship leaving. He therefore asked that arrangements should be made if necessary for the Secretary of State to return by either Service aeroplane or by Imperial Airways. He was very determined, knowing adverse conditions might be met on the Baghdad—Karachi section, that no persuasion would make him leave until he was perfectly satisfied.

Replying to other questions on this subject, Sq. Ldr. Nixon said the last conversation was two or three days before the ship left for India, but it was continually being discussed because Wing Commander Colmore had put forward a long time previously a proposal that intermediate mooring towers should be erected at Baghdad or Basrah on the Egypt—India section, and at Malta on the Cardington—Egypt section. He was impressed with the necessity of having emergency arrangements, and brought great pressure to bear for these mooring towers, pointing out that not only was it a safeguard from the emergency point of view, but also it was commercially sound, as it would enable a commercial airship to leave with even a larger percentage of reserve fuel because she had a base half-way over, and yet she would be able to carry an extra five tons of freight, and that five tons would pay for the capital cost of the mooring tower in one year. That, to the best of his recollection, was put forward a year before the ship did her trial, or probably 18 months before.

Replying to Lieut.-Col. Moore-Brabazon, Sq. Ldr. Nixon said that at one time the suggestion had been made that the airship should go out to India and remain two months for local flying. The idea was given up and the decision was made that the ship should return on the first flight and should go out again later for local flying.

Mr. L. G. S. Reynolds, principal private secretary to the Secretary of State for Air, said that the document referred to by the previous witness had not been, as far as he knew, brought to the knowledge of the Air Ministry. The question of intermediate masts had been considered. Wing Cdr. Colmore would have liked to have had them for future operations.

Mr. A. J. Cook, recalled, related how, half an hour before the ship started, Hunt had said, "Look at my gasbags; if we stop here much longer we shall have to start gassing again." Sq. Ldr. Nixon said that the last gassing was that afternoon about 2 o'clock.

Mr. T. S. D. Collins, technical officer of the Royal Airship Works, Cardington, and head of the Stressing Department, recalled, said that after careful consideration he did not think that the disaster was caused by loss of gas. He could produce calculations to show that there was an ample factor of safety. He suggested currents of air on the ship as a possible cause. He thought that something should be said about the small amount of actual flying that the ship had had and also possibly about the experience of the crew in handling the ship in rough weather. He referred to the years when no airship flying had been done and said that he thought that a vertical current of air acting downwards on the nose or upwards on the tail of the airship might have caused her to make a tilt.

Captain Meager, recalled, said that he agreed generally with Dr. Eckener, but thought that a rent was made in the gasbag in the first dive. He could not think of any explanation of the dive than that it was caused by a large loss of gas. Both the flight coxswains had served with him on the R.33 and had had enough experience of R.101 to have become quite familiar with handling her.

Sq. Ldr. Wann, who was in command of the R.38 when she broke up, agreed with Mr. Collins that the crew had not had much experience and said that German coxswains could keep a ship flying at 200 ft. above the ground. He did not think that the change of watch was contributory to the accident. He had examined a good many of the theories of the cause of the accident and the only one that he could make fit the facts was a large gasbag failure forward. He could not judge whether that failure took place immediately prior to or during the first dive. The ship was travelling faster than in any of her trials.

Mr. Teed, who represented the widow of Flt. Lt. Irwin, said that he thought, in view of the evidence of Sq. Ldr. Booth and Dr. Eckener, and also of the documentary evidence, that the position of Flt. Lt. Irwin must be absolutely established. The evidence during the last few hours of the Inquiry had established his reputation in the most formidable manner. The Solicitor-General associated himself with this view. He said that Flt. Lt. Irwin had been shown by the evidence to be the most fully qualified person possible to take over the command of the airship and the other officers who had perished in the disaster might all be looked upon as fully qualified men well up to their job

Sir John Simon said that was the general conclusion to which the Court had come, and they included Colonel Richmond and the technical experts. The whole thing was a terrible disaster, and they could only hope that now the Court was to consider their report they would be able to present a clear account, and, he trusted, a helpful account; they would certainly do it with much greater advantage because of the help given by Mr. Teed and the Law Officers. He could not announce when they would make the report.

The Solicitor-General thanked Sir John for the kind and patient way he had conducted the inquiry.

## FRENCH SCHNEIDER COMPETITORS.

A French High Speed Flight, consisting of three officers, has been tentatively chosen. These officers are Capt. Amanrich, Lieut. Demougeot and Lieut. Bougault. They have made a number of flights on high-speed seaplanes at the Lac de Hourtin, near Bordeaux.

Two companies, Bernard and the Nieuport-Delage, have built racing seaplanes with the new 1,000/1,650 h.p. Hispano-Suiza engine, but one learns on good authority that the French Air Ministry has given orders to both the Lorraine and the Renault companies to build racing engines for the next contest. The general belief is that these engines will not be ready in time and that, therefore, the Hispano-Suiza engine will be used.

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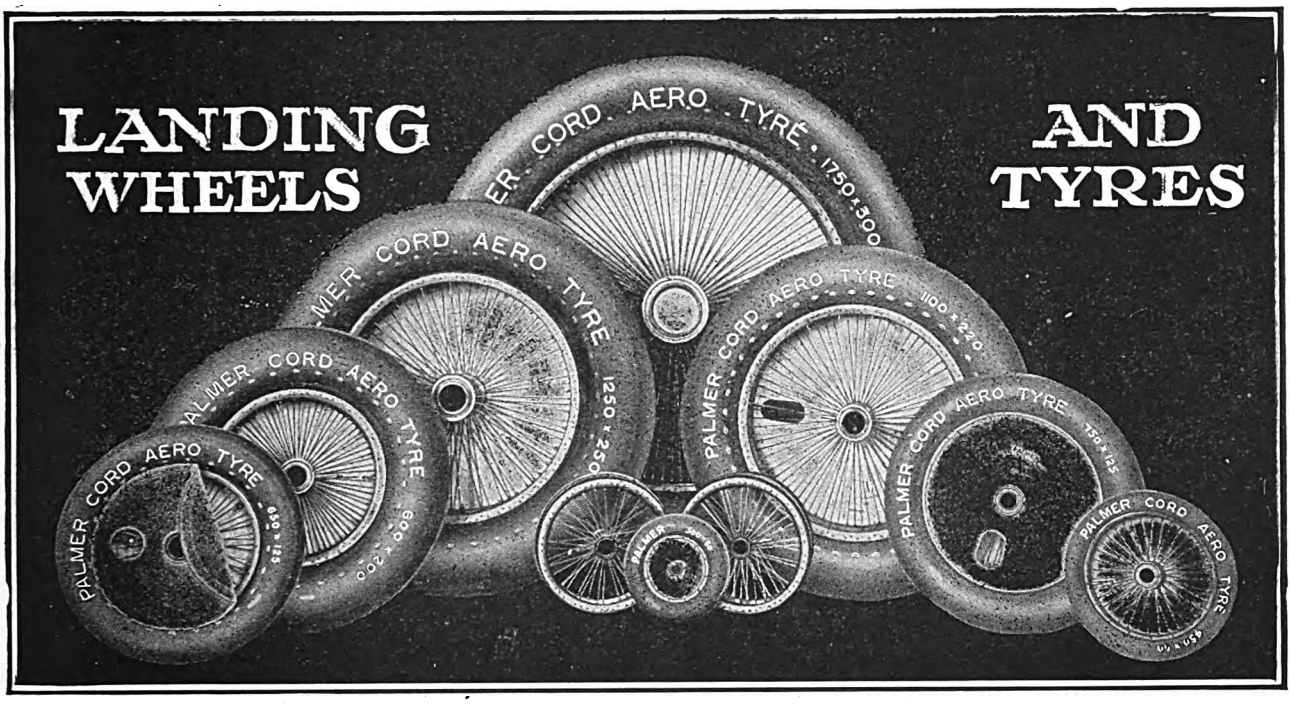


## STANDARD SIZES.

| Tyre Size | Wheel No. | Hub Length | Hub Bore | Track Line | Tyre Size | Wheel No. | Hub Length | Hub Bore | Track Line | Tyre Size | Wheel No. | Hub Length | Hub Bore | Track Line |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m/m | m/m | m/m | | | m/m | m/m | m/m | | | m/m | m/m | m/m |
| 375×55 | 168 | 111.12 | 25.4 | Central | 700×100 | 112 | 150. | 38.09 | Central | 1000×150 | 210 | 185. | 60.32 | Central |
| ,, | 195 | 130. | 38.09 | Central | ,, | 176 | 178 | 44.45 | Central | 1000×180 | 148 | 220. | 80. | Central |
| 300×60 | 16 | 111.12 | 25.4 | Central | ,, | 179 | 178. | 55. | 132/46 | ,, | 149 | 185. | 55. | Central |
| 450×60 | 30 | 89. | 31.75 | Central | 650×125 | 119 | 178. | 55. | 132/46 | ,, | 155 | 220. | 66.67 | Central |
| ,, | 172 | 130. | 38.09 | Central | ,, | 147 | 178. | 55. | Central | ,, | 166 | 185. | 55. | 125/60 |
| 575×60 | 21 | 160. | 28. | Central | ,, | 188 | 120. | 34.92 | Central | 900×200 | 107 | 185. | 55. | Central |
| ,, | 180 | 150. | 38.09 | 104/46 | ,, | 336 | 178. | 44.45 | 132/46 | ,, | 108 | 185. | 55. | 125/60 |
| ,, | 186 | 120. | 34.92 | Central | 750×125 | 77 | 178. | 44.45 | 132/46 | ,, | 128 | 220. | 66.67 | Central |
| ,, | 190 | 150. | 38.09 | Central | ,, | 92 | 185. | 55. | 135/50 | ,, | 137 | 250. | 80. | Central |
| 600×75 | 21 | 160. | 28. | Central | ,, | 95 | 185. | 55. | Central | ,, | 157 | 185. | 80. | Central |
| ,, | 180 | 150. | 38.09 | 104/46 | ,, | 99 | 178. | 38.89 | 132/46 | ,, | 202 | 185. | 60.32 | Central |
| ,, | 186 | 120. | 34.92 | Central | ,, | 112 | 150. | 38.09 | Central | 1100×220 | 134 | 220. | 66.67 | Central |
| ,, | 190 | 150. | 38.09 | Central | ,, | 176 | 178. | 44.45 | Central | ,, | 136 | 250. | 80. | Central |
| 700×75 | 78 | 178. | 44.45 | 132/46 | ,, | 179 | 178. | 55. | 132/46 | 975×225 | 192 | 185. | 60 32 | Central |
| ,, | 79 | 178. | 44.45 | Central | 800×150 | 161* | 185. | 55. | 135/50 | ,, | 194 | 185. | 55. | 125/60 |
| ,, | 100 | 178. | 38.09 | 132/46 | ,, | 162* | 185. | 55. | Central | 1100×250 | 364 | 220. | 60.32 | Central |
| ,, | 101 | 178. | 31.75 | 132/46 | ,, | 163* | 185. | 66.67 | 135/50 | 1250×250 | 314 | 250. | 80. | Central |
| ,, | 196 | 178. | 55. | Central | ,, | 169† | 185. | 55. | 135/50 | ,, | 154 | 304.8 | 101.6 | Central |
| 600×100 | 188 | 120. | 34.92 | Central | ,, | 177 | 185. | 55. | 135/50 | 1500×300 | 305 | 304.8 | 152 4 | Central |
| ,, | 304 | 150. | 38.09 | 104/46 | ,, | 183 | 185. | 55. | Central | ,, | 306 | 304.8 | 101.6 | Central |
| ,, | 333 | 120. | 34.92 | Central | ,, | 211* | 185. | 60.32 | 135/50 | 1525×325 | 197 | 304.8 | 101.6 | Central |
| 700×100 | 77 | 178. | 44.45 | 132/46 | 1000×150 | 167 | 185. | 55. | 125/60 | 1750×300 | 139 | 400. | 152.4 | Central |
| ,, | 92 | 185. | 55. | 135/50 | ,, | 174 | 250. | 80. | Central | ,, | 191 | 350. | 150.3 | Central |
| ,, | 95 | 185. | 55. | Central | ,, | 182 | 185. | 55. | Central | 1750×350 | 193 | 400. | 125. | Central |
| ,, | 99 | 178. | 38.89 | 132/46 | ,, | 187 | 220. | 66.67 | Central | 2000×450 | 363 | 500. | 152.4 | Central |
| | | | | | | 201 | 185. | 60.32 | 125/60 | | | | | |

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# THE AKROYD-STUART MEMORIAL LECTURE.—II.

## CHARACTERISTICS OF THE THREE ENGINES.

| | Beardmore 8-cylinder in-line, water-cooled. | Junkers S.L.1. 6-cylinder double-piston two-stroke water-cooled. | Packard 9-cylinder radial air-cooled. |
|---|---|---|---|
| Number of pistons ... ... ... ... ... | 8 | 12 | 9 |
| Bore ... ... ... ... ... ... | 8¼ in. | 4¾ in. | 4 13/16 in. |
| Stroke ... ... ... ... ... ... | 12 in. | 8¼ in. | 6 in. |
| Swept volume ... ... ... ... ... | 5129 cub. in. | 1739 cub. in. | 980 cub. in. |
| R.p.m. normal ... ... ... ... ... | 1000 | 1500 | 1950 |
| Mean piston speed ft. per min. ... ... ... | 2000 | 2060 | 1950 |
| Compression ratio ... ... ... ... ... | 12.25 : 1 | 14 : 1 | 16 : 1 |
| Normal power ... ... ... ... ... | 650 | 600 | 225 |
| Dry weight ... ... ... ... ... | 4500 lb. | 1648 lb. | 510 lb. |
| Weight per h.p. ... ... ... ... ... | 6.9 lb. | 3.08 lb. | 2.26 lb. |
| Cylinder b.m.e.p. at normal power ... ... ... | 101 | 91 | 94 |
| Max. cylinder pressure allowed ... ... ... | 850 | not given | over 1200 |
| Fuel consumption lb. per b.h.p. hour ... ... ... | .35 to .4 | .375 to .4 | .35 to .4 |

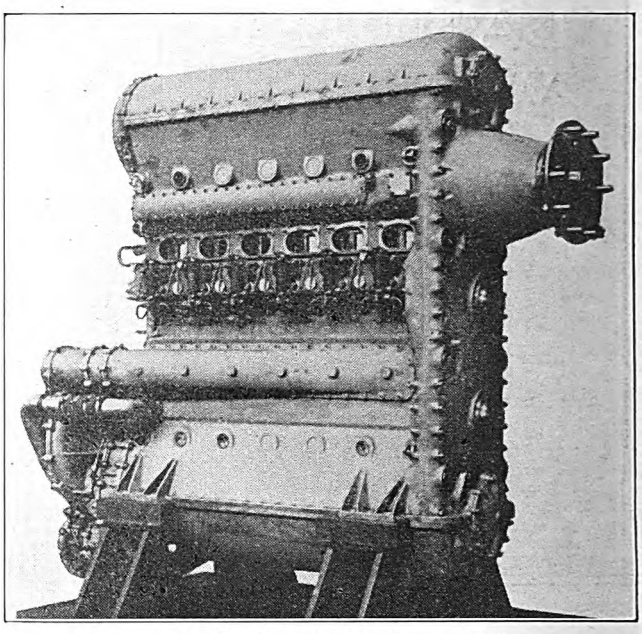
### PRACTICAL DEVELOPMENTS.

There are three different heavy oil engines which may be said to have reached practical development at the present time. These are the Beardmore Tornado, the Junkers S.L.1 and the Packard 9-cylinder radial air-cooled. [Mr. Pye says nothing of the Fiat and Clerget and Hispano-Clerget, though these three types are reported to have flown in aeroplanes.—ED.]

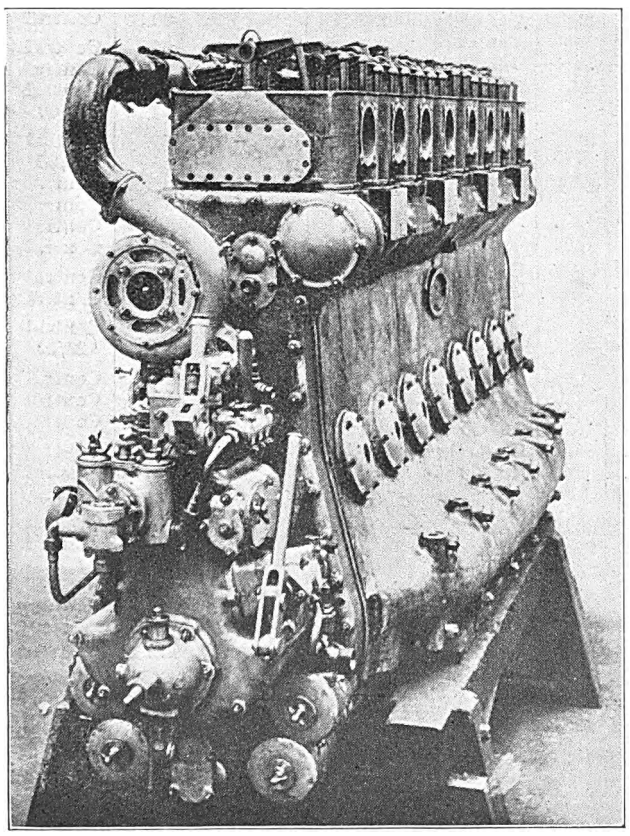
The Beardmore engines throughout more than 200 hours under British type test conditions maintained a fuel economy of under .4 lb. per b.h.p. hour and a maximum power corresponding to a cylinder m.e.p. of 101 lbs. per sq. in. The high weight per h.p. ratio of this engine is due to the use of steel crankcases made necessary by torsional resonance troubles and the difficulties of producing at the time of their development sound light-alloy castings of such size and complexity. Reversion to light alloy and a raising of the rated output to 700 h.p. should only be a matter of development which should at once reduce the weight per h.p. to less than 4.

The production of high m.e.ps. on a two-stroke cycle with its advantages of a working stroke every revolution depends upon efficient scavenging. The only really satisfactory type is an end-to-end scavenge and this can be simply achieved by using two pistons per cylinder. The difficulty is to co-ordinate the power from the pistons and this can be done by gearing two crankshafts together as is done in the Junkers aero-engine; by having one crankshaft and long connecting-rods outside the cylinder for the most remote pistons; or by having two swash-plates on one shaft. The adoption of gearing for the Junkers aero-engine appears to have been quite successful. Apart from the increased output per cylinder derived from the number of working strokes per revolution, Junkers saves the weight of separate valve gear and cylinder heads for twelve cylinders. Offset against this is the robust gearing between the airscrew and crankshafts.

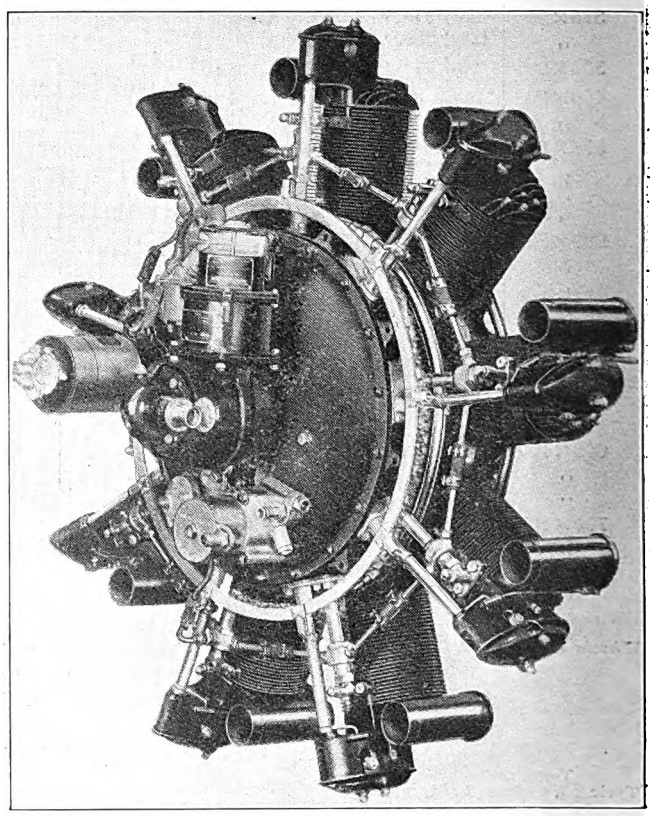
The interest of the Packard engine lies not in the originality of its layout, but in the combustion conditions in the cylinders and in the great ingenuity shown in the details of the design and in the methods adopted for dealing with the special difficulties of the compression ignition engine. With an engine of quite normal air-cooled radial design a remarkably low weight per h.p. and fuel consumption have been achieved, but at the expense of very high maximum cylinder pressures.



**The Junkers S.L.1 six-cylinder twelve-piston water-cooled two-stroke heavy-oil engine.**



**The Beardmore Tornado eight-cylinder in-line steam-cooled heavy-oil engine.**



**The Packard nine-cylinder air-cooled radial engine.**

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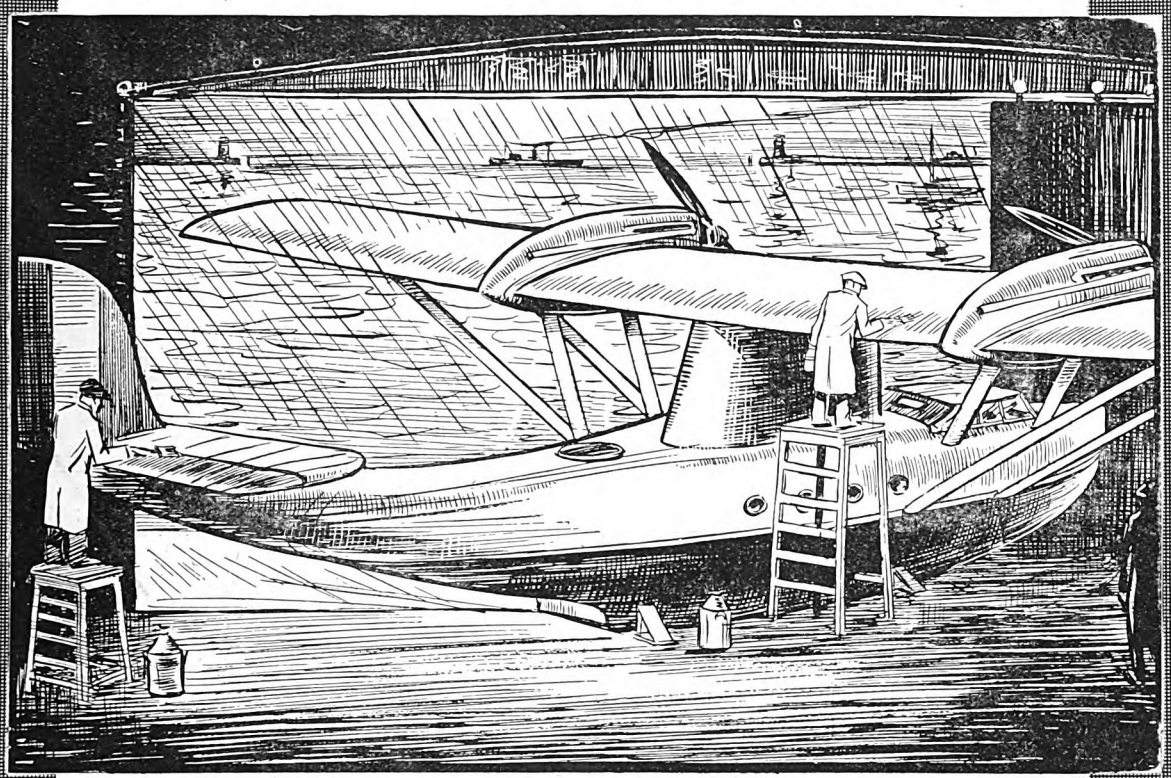
# CELLON under adverse conditions



It is not always possible to carry out doping in a heated shop—it must sometimes be done in the sheds or open air. Special Cellon Doping Schemes are in existence for such circumstances. They enable doping to be carried out under extreme conditions of humidity (up to 90%) and are therefore of interest to all constructors, repair depots, etc. These adverse doping schemes have been fully approved by the A.I.D.

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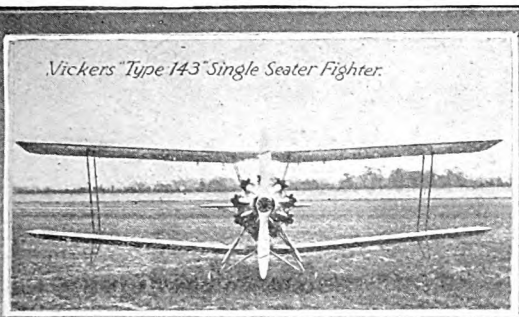
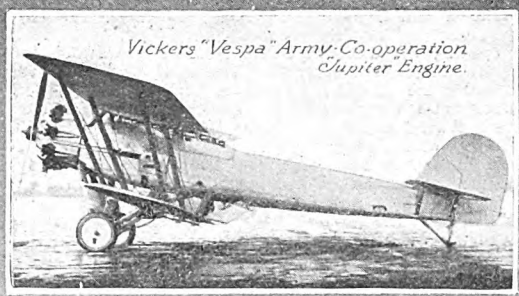
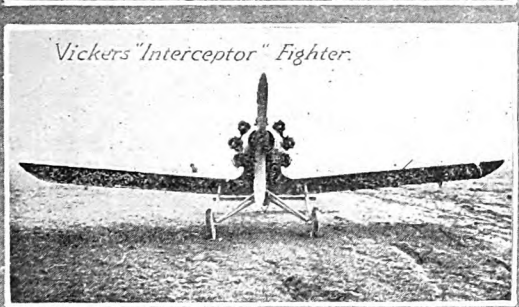
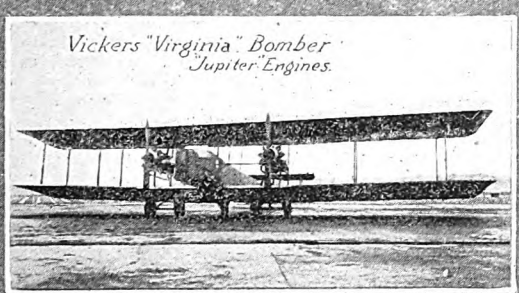
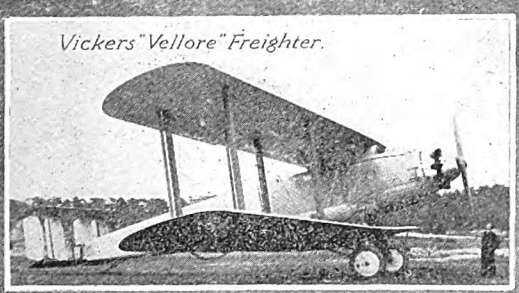

Vickers "Type 143" Single Seater Fighter.

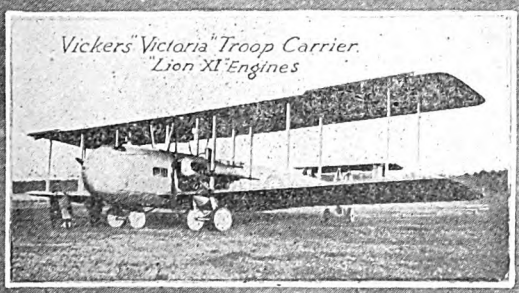

Vickers "Vespa" Army-Co-operation "Jupiter" Engine.

Vickers "Vildebeest" Torpedo Bomber. "Jupiter VIII" Engine.


Vickers "Interceptor" Fighter.


Vickers "Virginia" Bomber "Jupiter" Engines.


Vickers "Vellore" Freighter.


Vickers "Victoria" Troop Carrier. "Lion XI" Engines

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a better power-weight ratio is likely to spoil the outstanding fuel economy of the compression ignition engine at full power conditions, but under cruising conditions might afford great possibilities of high economy and reasonable power weight-ratio together with a reserve of power for take-off and climb when economy could be sacrificed.

THE DISCUSSION.

MR. FAIREY, opening the discussion, said that he would like to be the first to congratulate the lecturer and although he was somewhat diffident in opening the discussion with so many engine experts present said that there were one or two questions he would like to ask. Why were the weights per h.p. of the Junkers and Packard 1/2 and 1/3 respectively of the weight per h.p. of the Beardmore? The ignition-compression engine also ought to have the advantage of better reliability as the carburettor and magneto were dispensed with. He suggested that as there were likely to be a large number of speakers, compliments to the lecturer might be taken as expressed.

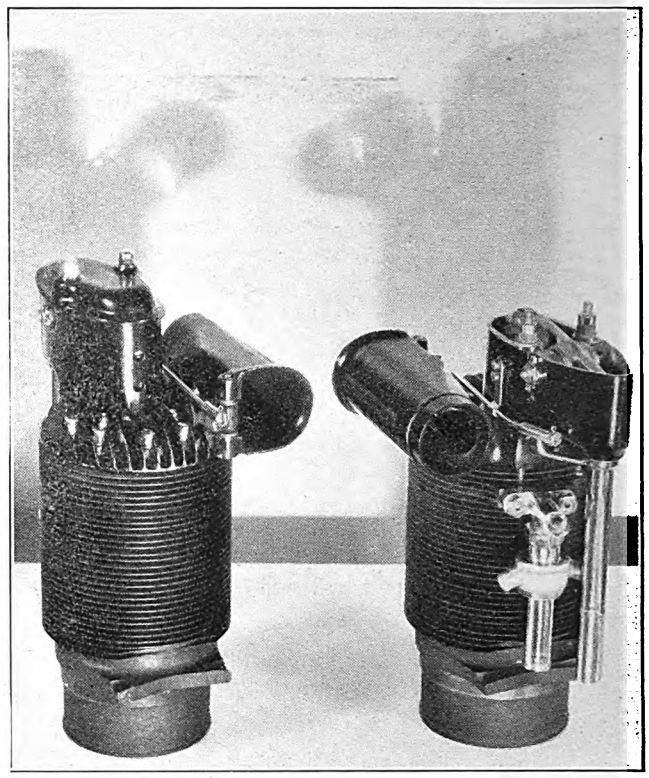
MR. H. E. WIMPERIS, who is the Director of Scientific Research at the Air Ministry, said that he was very glad that we had at last got this matter put right and that we knew how much was due to Mr. Akroyd-Stuart. Mr. Pye had looked up an enormous amount of references and he thought Mr. Pye's remark that something less than justice had been done to Akroyd-Stuart was significant. We can now admit that in the hall of fame Mr. Akroyd-Stuart has a niche.

He pointed out that to equal the petrol engine the m.e.p. and piston speed of the conventional Diesel had to be doubled. This had been nearly successfully done and the prospect of the engine was exceedingly good. He thought that the Air Council had been very fortunate in the tools which had lain to their hands. One might refer to them as the three "R"s: Ricardo, the R.A.E., and Rolls-Royce. These multiplied by $\pi$ gave remarkable results. He referred to Mr. Pye's remarks that both the designs of the Junkers and the Packard Diesel had justified themselves and said that we were working towards the same end.

MR. RICARDO said that although Mr. Pye had credited the origin of the engine to Dr. Diesel he thought that a tremendous amount had been done at the works at Augsburg towards converting a nebulous heat-cycle to a practical engine. In all inventions more was due to a combination of circumstances than individual brilliance. He thought that the whole of the modern development was a result of the work done at the R.A.E. and that not a single Continental engine could show results equal to those produced eight years ago by the R.A.E.

Farnborough and the people there were under the disadvantage of having English names, whereas he had the advantage of a remote ancestor with a foreign name. [At which remark a distinguished and dignified member grunted "It's not the name but the man!"—ED.] He thought that the pre-combustion engine was put out of court by the fact that in such types hot gases had to be forced through a restricted space. He did not agree that the pre-combustion engines were easy to start, indeed they were so difficult that it was necessary to take a red-hot poker to get them off the starting line at all.

MR. A. J. ROWLEDGE said that his firm (Rolls-Royce Ltd.) were fortunate in that as commercial designers they had the results of all the research work placed before them so that they could make practical designs,—and money. He wished to express his appreciation of the way in which all these results had been handed over.

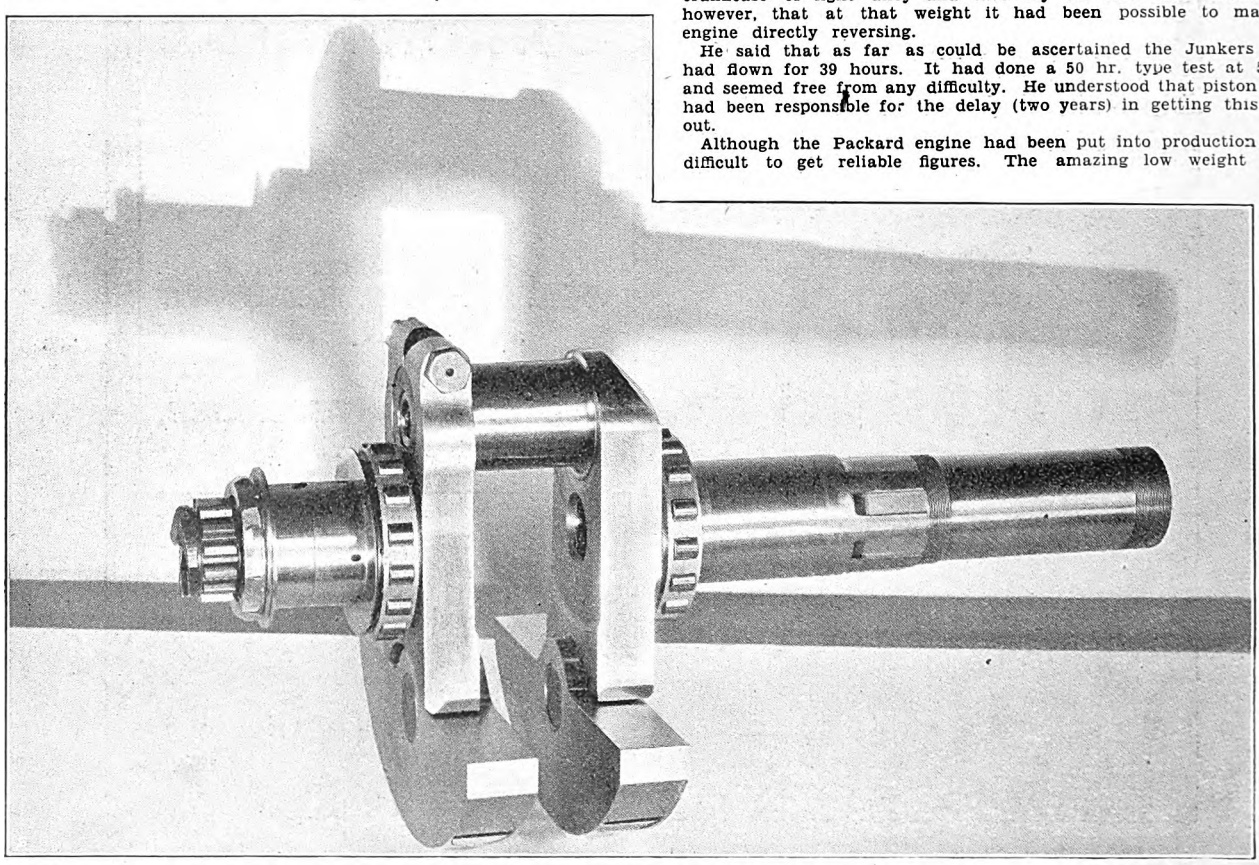


**Left, front view of cylinder assembly; right, rear view of cylinder of Packard Diesel.**

MAJOR G. P. BULMAN, who is Assistant Director (Engines) in the department for Supply and Research at the Air Ministry, explained the difficulty of his position by likening himself to the Joker and Mr. Pye to the Ace. Referring to the reliability of the three types, he said that the Beardmore Tornado had run for 225 hrs. at full power driving an airscrew and that we could therefore say the engine was well-proved. The very high weight per h.p. was partly due to the form (eight-cylinders-in-line). The steel crankcase and water-jacket system was used to overcome the troubles of torsional resonance, but now that these had been controlled, one might hope to return to a crankcase of light alloy and save say 800 lbs. One should note, however, that at that weight it had been possible to make the engine directly reversing.

He said that as far as could be ascertained the Junkers engine had flown for 39 hours. It had done a 50 hr. type test at 500 h.p. and seemed free from any difficulty. He understood that piston trouble had been responsible for the delay (two years) in getting this engine out.

Although the Packard engine had been put into production it was difficult to get reliable figures. The amazing low weight of this



**The built-up crankshaft of the Packard Diesel showing the flexibly-mounted balance-weights. Despite so many "brilliant expedients" this engine only runs on Kerosene (or our lamp oil) and has to be practically taken to pieces every few hundred miles for internal repairs.**

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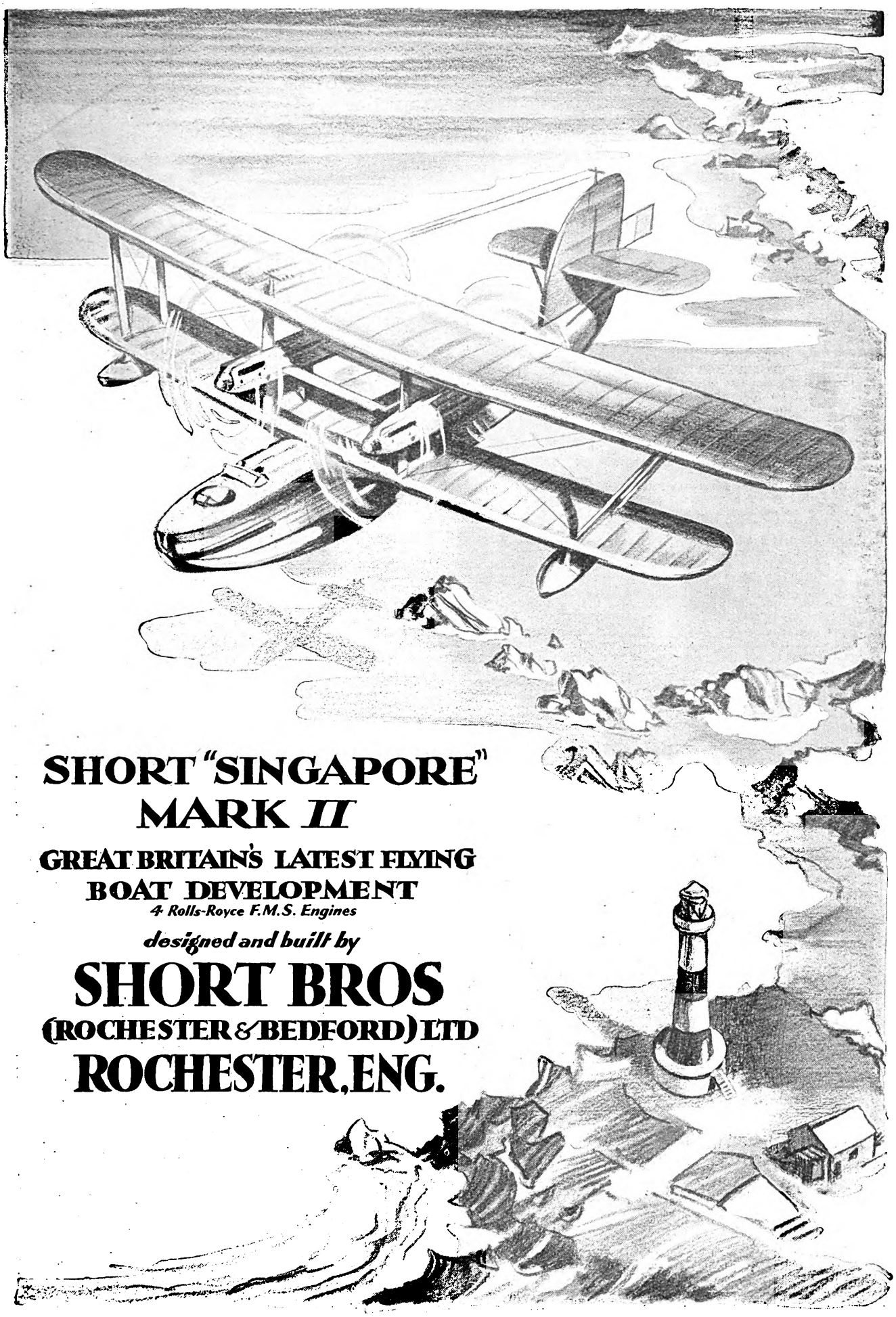




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engine had been obtained by features of design which could almost be said to border on rashness, and was assisted by the use of magnesium for the crankcase which weighed only 28 lbs One might say that the low weight had been obtained by expedients of a brilliant type. He said that such information as could be obtained would be available to ourselves in a few weeks.

WING CDR. CAVE-BROWNE-CAVE, referring to Table No. II of the lecturer, said that the figures for the Beardmore Tornado were not quite correct. The normal r.p.m. were given as 1,000, actually they were 900 r.p.m. This was partly because of torsional resonance and partly because of airscrew requirements. The engine could have been given a higher performance. The high weight per h.p. was an inevitable result of the in-line arrangement, which had on the other hand advantages in the convenience of installation and ease of access in flight.

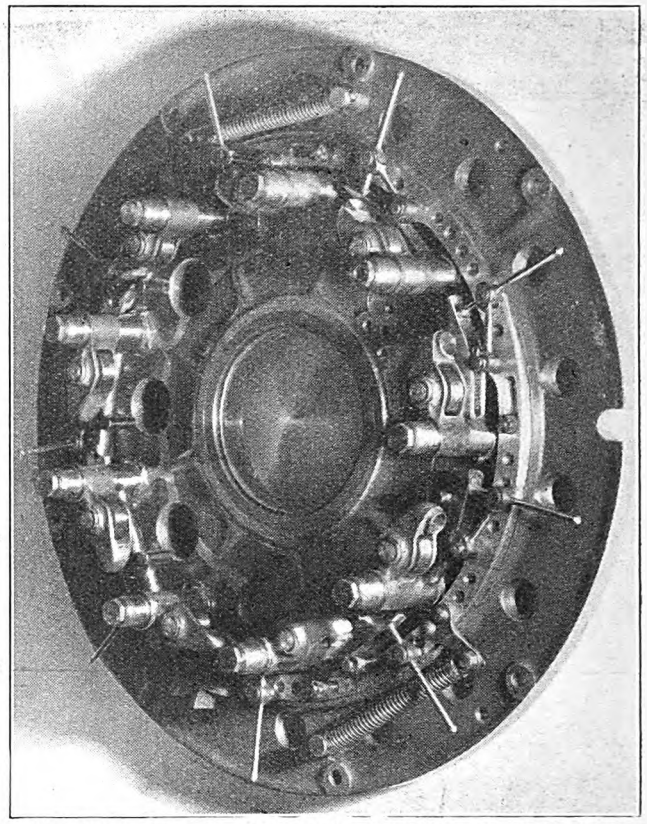
He thought that the great lesson to be learnt from the Tornado was that if you want to speed up development you must have more than one engine and get through the running tests quickly. He thought that now we had got so far it was worth an enormous effort to get through the next stage in the shortest time. He suggested that a definite line of research should be taken to overcome the difficulties of the effect of very high maximum pressures on the bearings of the connecting-rods.

One way to overcome these would be to increase the inertia forces,—run the engine faster. Running faster improved the effects of the organised swirl and Ricardo jet. The inertia forces of the atomiser were low. He was glad Mr. Ricardo had mentioned starting as the installation of a starter would be necessary. He pointed out that for the same journey the cost of oil fuel was but 14 per cent. of that of petrol, the tankage was but 67 per cent. and most importantly there was the safety from fire, which would have a big effect on public feeling towards the safety of aircraft.

MR. TURNER, who said nothing about his own ingenious form of wobble-plate engine, said he felt privileged at being asked to speak. He mentioned the great discussion at the Swiss Locomotive Works at Winterthur in Switzerland in 1920 as to what the first airless injection commercial engine for commercial purposes should be called. It was finally decided to call it an airless-injection engine. He asked whether Mr. Pye could tell him how much actual research had been done on double-swash plate engines. He had heard that the Michel Company of America was developing such an engine.

MR. DAVIS, of East London College, who expressed the opinion that the future lay with engines of the organised swirl type, drew a copy of a graph on the black-board which showed how much more efficient commercial Diesel engines of 50 h.p. of the Brotherhood-Ricardo type were as opposed to the other types. He also showed that the Junkers type was efficient especially when considered in the light of the high scavenging pressure employed.

MR. ALLEN suggested that a double-"Z" crankshaft might be employed instead of the swash-plates advocated by Mr. Pye. He asked for information as to the types of atomiser and shape of combustion head used in the Packard engine.



**The Cam-ring assembly of the Packard Diesel showing the way in which the stroke of the pumps is varied.**

ANOTHER SPEAKER asked what effect the position of the holes in the injector nozzles had on the side-thrust of the pistons.

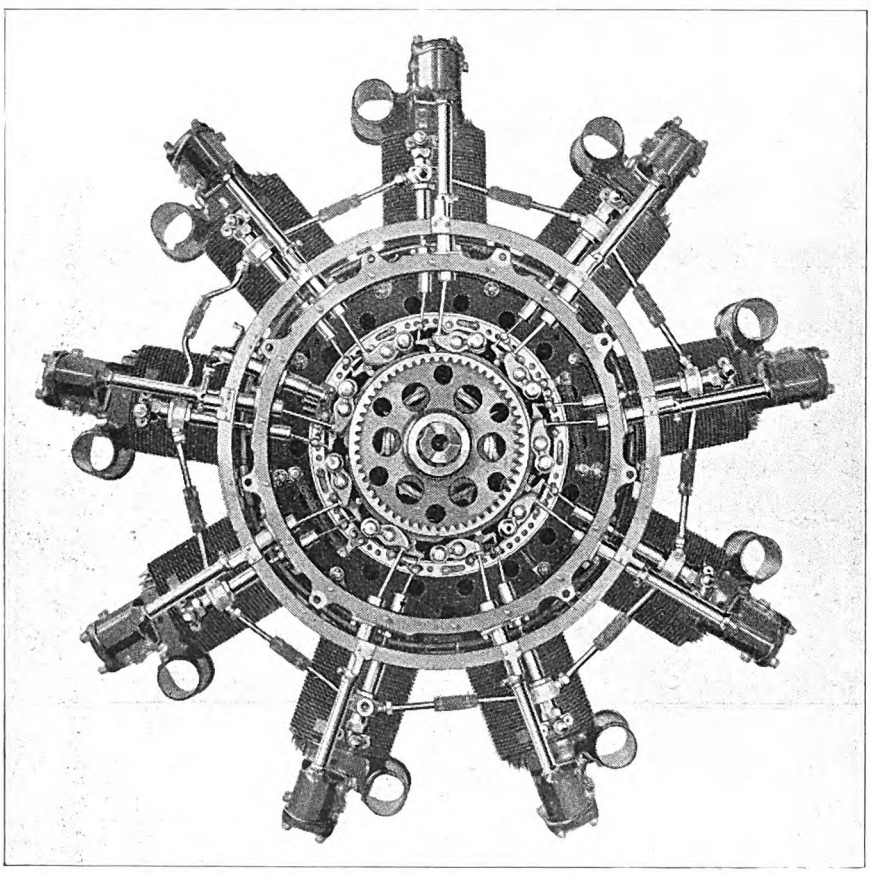
MR. FAIREY said that speakers had accepted his suggestion that no compliments should be made, but that he hoped after Mr. Pye had replied that the audience would show their appreciation by acclamation.

MR. PYE thanked Major Bulman for answering one question better than he could have answered that particular question himself. He reminded Major Bulman that the Joker always counted one point higher than the Ace. He expressed the opinion that patents are always misleading and more often they are damnable. He had no experience of the pre-combustion engine, but he had suggested that it might have advantages in ease of starting as such a remark might pass as a point in its favour.

Referring to the figures in Table II, he said that about 4 lbs. per h.p. might be saved on the Tornado by giving it an alloy crankcase and raising its speed. He knew of no work on the double-swash plate. He had heard of the Michel swash-plate, but if it was a four-stroke he would take long odds against its survival, because the loss of power during the idle stroke was as great as the loss of power during the power stroke, and the only hope of reducing the losses to the same order as those of a crankshaft engine was to make the engine a two-stroke.

He had thought about the adaptation of the wobble-plate (or double-"Z" crankshaft), but there were serious difficulties at balancing at high speeds and preventing the rotation of the spider. The Packard jet was (he thought) of the flat fish-tail type and was squirted across the top of the cylinder and deflected upwards by a depression in the head of the piston.

[The deserved acclamation was duly forthcoming.—ED.]



**A rear view of the Packard Diesel with the cover-plate removed. The ring and its springs, against which it is rotated to alter the stroke of the pumps, can be clearly seen.**

## AIRSHIP ENGINES' WEIGHT.

In the House of Commons on Nov. 12, in reply to a question by Sir W. Brass, the Under-Secretary of State for Air said that the total weight of the petrol engines (with reversing gears) installed in R.100 was 10,424 lbs., while that of the heavy oil engines in R.101 was 23,300 lbs. giving approximate weights per horse-power of 2.9 lbs. and 7.96 lbs. respectively. The greater weight of the heavy oil engine was more than counterbalanced on a long flight by its smaller fuel consumption.

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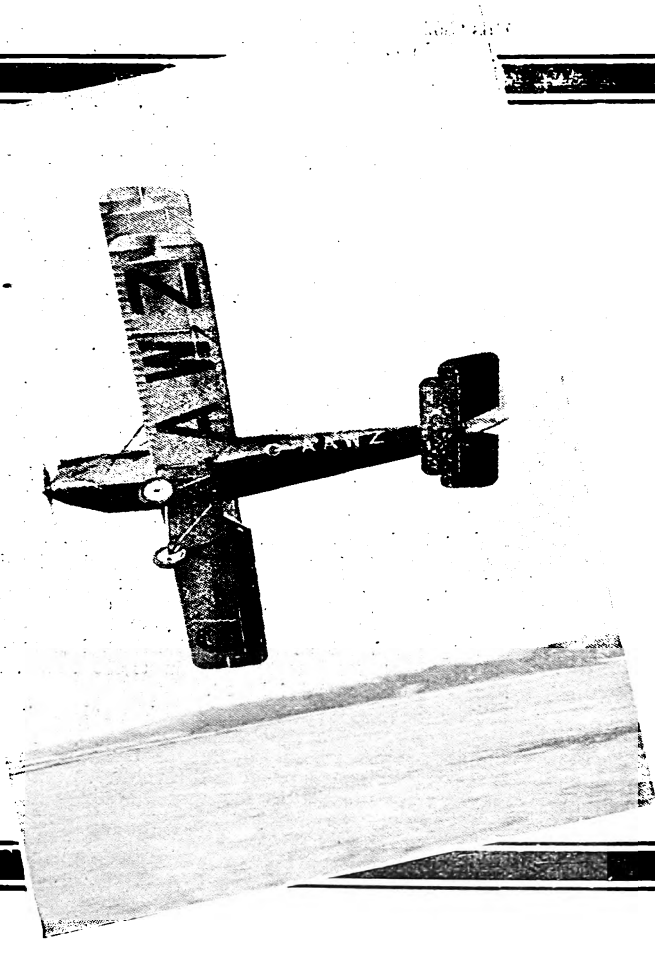


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COMFORT of pilot and passenger has been well regarded in the design of the "Arrow." The cockpits are roomy, and visibility is unusually good. It is a light machine that should appeal strongly to the flying club or school.

The Spartan "Arrow" is designed to take a Gipsy II, Cirrus-Hermes, Gipsy I, or Cirrus III engine; thus, the prospective owner has a wide choice of power unit.

The certificate of airworthiness has been granted for the high figure of 1750 lbs., and the aerobatic certificate for a total weight of 1560 lbs.

A full specification is available upon request, but the following figures outline the performance of a Spartan-Arrow (Gipsy II) in the normal category.

*Top Speed 103-105 mph. Cruising Speed 85-90 m.p.h.*
*Take-off 100-130 yards. Landing Run 100-120 yards.*
*Rate of climb at sea level, 700 feet per min.*

*SUPPLIED AS LANDPLANE, SEAPLANE OR SKIPLANE.*

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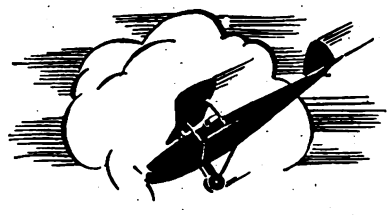

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### THE G.A.P.A.N.

The Secretary of the Guild of Air Pilots and Navigators sends the following addition to the Annual Report already published.

A Meeting of the Court was held on Dec. 4. Some of the matters discussed were:—Navigation Classes, Aerodrome Rules and Licences.

The Guild is represented at the Safety Congress in Paris and papers have been submitted by the Clerk and by Mr. Norman Macmillan. Representatives were sent to an informal meeting of pilots of several European countries with a view to discussion of matters of common interest.

The Guild reports that an appeal has recently been made to members and friends for a memorial to the late Squadron Leader Johnston and the suggestion is that the money should be used to buy a trophy to be awarded annually for the best feat of Civil Air Navigation.

The Court resolved unanimously that Mrs. Johnston, the widow of the late Deputy Master, should be elected an Honorary Member of the Guild.

Owing to the number of communications the Guild has received regarding the question of navigation classes, it states that it intends to extend its activities in this connection to the Provinces to cope with the demand, but it has not yet been definitely decided in what towns they shall be held. Fuller information on this question will be given shortly.

The Guild would again like to take this opportunity of referring to its Employment Bureau. On the Register there are 25 to 30 Pilots looking for suitable positions. The Guild states that it is in a position to fill any vacancy immediately on inquiry of the Secretary, and firms are requested to make a note of this facility.

### DE HAVILLAND NOTICE NO. 4.

To OPERATORS OF PUSS MOTHS.

In the original design of the Heater Box for the Gipsy III engine fitted into the Puss Moth, the exhaust outlet was led away by a short pipe through the side of the cowling. It was found at an early date that the exhaust from this pipe rapidly deteriorated the paintwork in the vicinity of the outlet, thus spoiling the general appearance of the cowling.

On more recently manufactured Puss Moths the location of this outlet has been altered so as to allow free use of the Heater Box without the disadvantage of damaging the paintwork. On some original Puss Moths the outlet pipe was blanked off with a detachable cap which, with the cap in place, rendered the Heater Box inoperative. It is found in practice, however, with the approach of colder weather conditions, that the use of the Heater Box definitely improves the running of the engine, and it is, therefore, now strongly recommended that all operators of Puss Moths which have the original pipe should put the Heater Box into operation by removal of the blanking cap. In order that owners shall not suffer the annoyance of damaged paintwork, The de Havilland Aircraft Company has developed and perfected a simple modification which, by attachment to the exhaust outlet pipe, leads the gasses away in the same manner as on the latest type of Puss Moth.

Should any owner wish to take advantage of this modification, the necessary parts can be obtained on application to the Service Manager, Stag Lane Aerodrome, Edgware, Middlesex. It is particularly requested that machine and engine number shall accompany every application.

### DE HAVILLAND NOTICE NO. 5.

To OPERATORS OF GIPSY II AND III ENGINES.

During cylinder overhaul opportunity should be taken to modify pistons of the following types: No. 800-15A and 800-15C, should they be fitted.

The modification consists of reducing the skirts of pistons to a minimum overall length of 70 mm., measured from the crown of the piston. The excess metal can be turned off or removed by hand. The barrel portion of the skirt where it meets the cross web should be radiused off at 5 mm. radius, and all sharp edges on the bottom of the skirt must be removed. Pistons should be accurately weighed after shortening, and any piston weighing less than 24 oz. 7 drams should be replaced by a new part.

Gudgeon-pins, washers and circlips to part Nos. 1300-17, 1300-18, 1300-19 should be replaced by improved types, part Nos. 800-17, 800-18, 800-19, which can be obtained on application to the Service Manager, The de Havilland Aircraft Company Ltd., Stag Lane Aerodrome, Edgware.

*Note*: The old type of gudgeon-pin is reduced in diameter at the ends to take the washer and circlip. The new type is of uniform diameter throughout.

### SHOWING THE ITALIAN FLAG IN SOUTH AMERICA.

At 07.35 hours on Dec. 17 a squadron of Savoia-Marchetti S.55 twin-hulled monoplane flying-boats (two 550 h.p. Fiat A.22 engines each) under the command of General Italo Balbo, the Italian Minister for Air, left Orbetello, near Rome, to fly in formation across the South Atlantic to Brazil.

The object of the flight is to make a practical test of formation flying over long distances and to show the Italian flag in a market which is coveted by the aircraft industries of Europe and North America.

The squadron consists of twelve machines and this squadron is divided into four flights of three. Each flight is distinguished by a distinctive colour. Each machine carries a crew of four, consisting of two pilots, an engineer and a wireless operator. The personnel of the squadron has undergone a long training at Orbetello, which included navigation, day and night flying, and a number of oversea flights to the coasts of Spain and North Africa.

The flight to Brazil has been planned to be done in seven stages. These stages are as follows:—Orbetello—Cartagena (1,200 kms.), Cartagena—Kenitra (700 kms.), Kenitra—Villa Cisneros (1,600 kms.), Villa Cisneros—Bolama, in Portuguese West Africa (1,500 kms.), Bolama—Port Natal (3,000 kms.), Port Natal—Bahia (1,000 kms.), and Bahia—Rio de Janeiro (1,400 kms.).

Very complete arrangements have been made for the flight. Two spare machines will accompany the squadron as far as Bolama, in Portuguese Guinea. These machines are carrying spare parts and mechanics and they can also be used as substitutes for any machines of the squadron which may suffer major damage. A tanker and a converted yacht will be stationed one on each side of the Atlantic, and seven light naval vessels will be posted along the route across the South Atlantic to give help if required and to maintain wireless communication with the machines while flying and to supply meteorological information.

As already mentioned the squadron is divided into four flights. The first flight, distinguished by black markings, carries the chief officers. The pilots of the first machine are General Balbo and Capt. Cagna, of the second machine they are General Valle, General Balbo's Chief of Staff, and Capt. Biseo, and of the third machine they are Lieut.-Col. Maddalena and Lieut. Cecconi, the present holders of the World's Duration Record.

Lieut.-Col. Maddalena will be in command of the squadron until the Brazilian coast is reached, after which General Balbo will take over the leadership.

The pilots of the three machines of the second flight, distinguished by white markings, are Capt. Agnesi and Lieut. Napoli, Capt. Boer and Lieut. Barbicini, and Capt. Draghelli and Lieut. Leone.

The pilots of the three machines of the third flight, distinguished by red markings are Capt. Marini and Capt. Miglia, Capt. Baistrocchi and Lieut. Gallo, and Capt. Recagno and Lieut. Abbiata.

The pilots of the three machines of the fourth flight, distinguished by green markings, are Capt. Longo and Capt. Bonini, Lieut. Cannistracci and Lieut. Vercelloni, and Lieut. Calo and Sergt.-Major Moretti.

After leaving Orbetello the fourteen machines flew across the Tyrrhenian Sea and part of the Mediterranean towards Cartagena, 744 miles distant. After 5½ hours of flying they encountered the storm which devastated Algiers on that day, and they were forced to take shelter in Palma harbour, Majorca. Eight of the machines took off again later on the same day, and reached Cartagena safely after a rough journey, and the other six, including that of General Balbo, remained to wait for better weather.

During Dec. 19 the storm reached great intensity, and gusts of sixty miles per hour, with high waves, held up all shipping between the Balearic Isles and the mainland.

By Dec. 20 all the machines had reached Cartagena and on Dec 21 they all got to Kenitra (French Morocco).

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Landing Speed
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Take-off Run
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Landing Run
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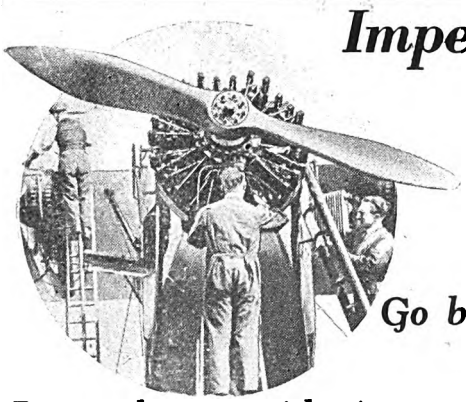

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# TRADE NEWS

### THE FAR EASTERN AVIATION CO. LTD.

The Far Eastern Aviation Co. of Hong Kong has been turned into a private limited company with a capital of $500,000. The directors are:—B. Lander Lewis (Chairman), R. Vaughan Fowler (Managing Director), F. R. Smith and G. G. N. Tinson.

The Far Eastern Aviation Co. was formed by Mr. R. Vaughan Fowler some years ago and this company has done a very considerable amount of business on behalf of British Aviation in China and Hong Kong. It holds the selling rights for, among other products, the Avro Avian, and a number of this type have been sold in the Far East through this company.

The Far East Aviation Co. Ltd. will also demonstrate a Westland Wapiti which is being sent out to China by the Westland Aircraft Works Ltd. for demonstration to the Chinese National Government, as well as a Blackburn Lincock, which is already being demonstrated in China by Flt. Lt. Swoffer.

In addition to the head office in Hong Kong the company has branches in Shanghai, Canton, Amoy, Foochow, Swatow, Peiping, Mukden and Nanking.

### A REPEAT ORDER FROM CHILE.

Five years ago the Chilean Government bought five Fairey IIIF General Purposes seaplanes from the Fairey Aviation Co. Ltd. The Chilean Government has just bought one more example of this type to be fitted, as were the first five, with a Napier Lion engine.

### THE MONO-SPAR SYSTEM IN AMERICA.

According to *Western Flying*, the American aviation monthly, the British Mono-spar system of aircraft construction and the Fury Axial engine are to be represented in America by a trust being organised by Herbert E. Linden, with headquarters in the Bendix Buildings, Los Angeles. The function of the trust will be to dispose of American rights to inventions held by the Electric and General Industrial Trust Ltd., London.

### A SCENTED MOTH.

M. Roland Coty, son of M. François Coty, the well-known manufacturer of feminine artificial elegance, has acquired a Morane-Saulnier Gipsy Moth.

M. François Coty financed the flight of the *Point d'Interrogation* from Paris to New York and has also financed the construction of the Dewoitine monoplane *Trait-d'Union* with which MM Doret and Le Brix will shortly attempt to break records. In addition M. Coty through his paper, *L'Ami du Peuple*, has shown considerable interest in aviation affairs although not always to the liking of the Authorities. Most of his recent *publicité* has concerned the equipment of the French *Armée de l'Air*, with particular reference to the large number of fatal accidents which occurred during the past Summer at the time of the French air manœuvres.

### A DIVERSITY OF STEELS.

There are so many steels available to-day to the Aircraft Manufacturer that to classify them all and keep check on them is no easy task. Nobody realises this better than the manufacturers of such steels, so one is not surprised when one finds that the English Steel Corporation Ltd. have summarised all the most important steels of the standard types which they produce

These summaries although quite compact are in a remarkably complete form. The material is described in full, together with its symbol and suitable specification number. To make reference easier the B.E.S.A. and Air Ministry specification numbers are give as well.

The mechanical tests and their results are summarised and in the last column the characteristics and applications of each steel are given.

Very naturally the English Steel Corporation Ltd. will have seen that all its customers in the Aircraft Trade have got a copy of this summary, but there will be a large number of persons who have to use these steels and have to design structures with them who are not aware of the trouble they could save by having a proper list.

We therefore suggest that such people should write and ask for one, mentioning THE AEROPLANE and the name of the firm for which they work. We have no doubt that the English Steel Corporation Ltd. of Vickers Works, Sheffield, will be very pleased to supply these summaries to responsible persons.

### THE HERCULES IN THE MIDDLE EAST.

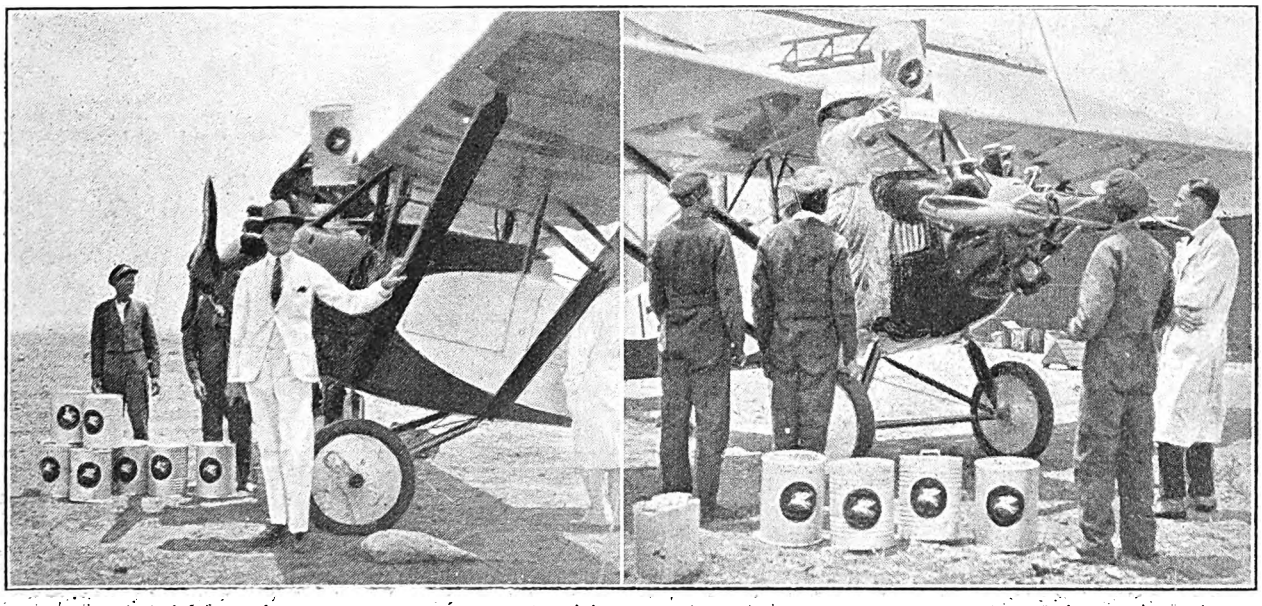
At the close of 1926 The De Havilland Aircraft Co. Ltd. built to the order of Imperial Airways Ltd. five 14-seater three-engined Hercules air-liners (Jupiter engines) for operation on their Middle East Route. Interesting figures have just been received about the flying record of three of this fleet, which have been in constant commission since the service began early in 1927. The record shows very big mileages and remarkable consistency, as follows:—

Hercules G-EBMW—171,696 miles—1,971½ hours.
Hercules G-EBMX—182,152 miles—2,105½ hours
Hercules G-EBMY—178,409 miles—2,075½ hours.

### A THREE-POINT SALES TALK.

A picture in THE AEROPLANE of Dec. 17 portrayed Lieut. Sarmento Pimentel and his family under the wing of a Puss Moth. In it he and Capt. Moreira Cardoso flew to Goa, a Portuguese possession in India, from Lisbon. The Governor of Goa was an up-and-coming private owner.

The appearance of the Puss Moth seems to be better sales propaganda than much argument, because when the officers landed the representative of the Governor was ready with his bid before the Puss Moth had stopped taxiing. It must have been a good bid, as the Governor of Goa now owns both a Junkers Junior and a Puss Moth and Lieut. Pimentel's expectant family must wait many weary weeks while he returns by boat.



**SERVICE IN SOUTH AFRICA:—The machines of the Italian flight from Rome to the Cape being revictualled at Bulawayo by the Vacuum Oil Company of South Africa Ltd. The figure in white on the left is that of Mr. S. Duncan, of Allen, Wack and Shepherd Ltd., Agents for the Vacuum Oil Company of South Africa Ltd.**

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## MANY INVENTIONS.

Edward Lear (an author Aviation people should study, by the way) wrote of the Pobble, who has no toes, having lost these artful aids to inherent stability in an ill-advised attempt to cross the Channel (that of Bristol, to be exact) under his own power. We read that the Pobble, when crossing—

> . . . . tinkledy winkledy binkled a bell,
> So that all the World might hear him,
> And all the Sailors and Admirals cried,
> As they saw him nearing the further side,
> He has gone to fish for his Aunt Jobiska's
> Runcible Cat with crimson whiskers.

The Pobble, you observe, did his best to warn the Authorities of his whereabouts, and they even knew the object of his journey, a more creditable one, no doubt, than that of many a private owner who flies to Paris, which is neither here nor there.

What *is* here and there, and everywhere else as well, is the fact that these people are not by law confined to travelling in a bath-chair with four-wheel brakes tethered by a strong chain to a tree so that they can only go round in ever decreasing circles. They are allowed to buy light aeroplanes and play the air-hog in them.

The Lord knows, the Pobble was accounted a nit-wit, but this class of private owner has the intelligence and courtesy of a jellyfish left in a desert for three weeks, compared to him.

They set off for Paris, circle Lympne, ignore St. Inglevert completely, and are never heard of for hours and hours, though they have in many cases put down in a place where every other kiosk is a public telephone box, and they never bother to put a call through to anyone.

While they are doing this, to their own complete satisfaction, the Croydon Control Tower gets more and more worried about their safety and puts the machinery in motion to broadcast for them. All shipping, including that of the Royal Navy, is asked to search for them, all Coastguards are put on the *qui vive*, lifeboats stand-by, and both the Admiralty and Air Ministry are put into a state of seething unrest, while, for aught one knows to the contrary, the Ministry of Agriculture and Fisheries gets all worked up as well.

This in itself is lamentable, but, what is worse, commercial pilots doing an honest job of work on the air routes are heavily penalised by the action of the air-hog, for they are jammed out of vital wireless communication with the Control Tower because the needs of the air-hog take up all the available ether.

Commercial machines wanting positions cannot get them. The Control Tower cannot take bearings. And essential messages cannot be sent to or received from machines.

This sort of thing is crass selfishness and has other names besides, which no respectable journal can print.

Anyway, the Pobble, who has no toes, was a gentleman (with his little bell) compared with the private owners one refers to, who never bother to warn anybody. As a matter of fact, one is happy to know that after the tragedy the Pobble's Aunt Jobiska

> Made him a feast at his earnest wish,
> Of eggs and buttercups fried with fish.

and remarked (dear thing that she was)

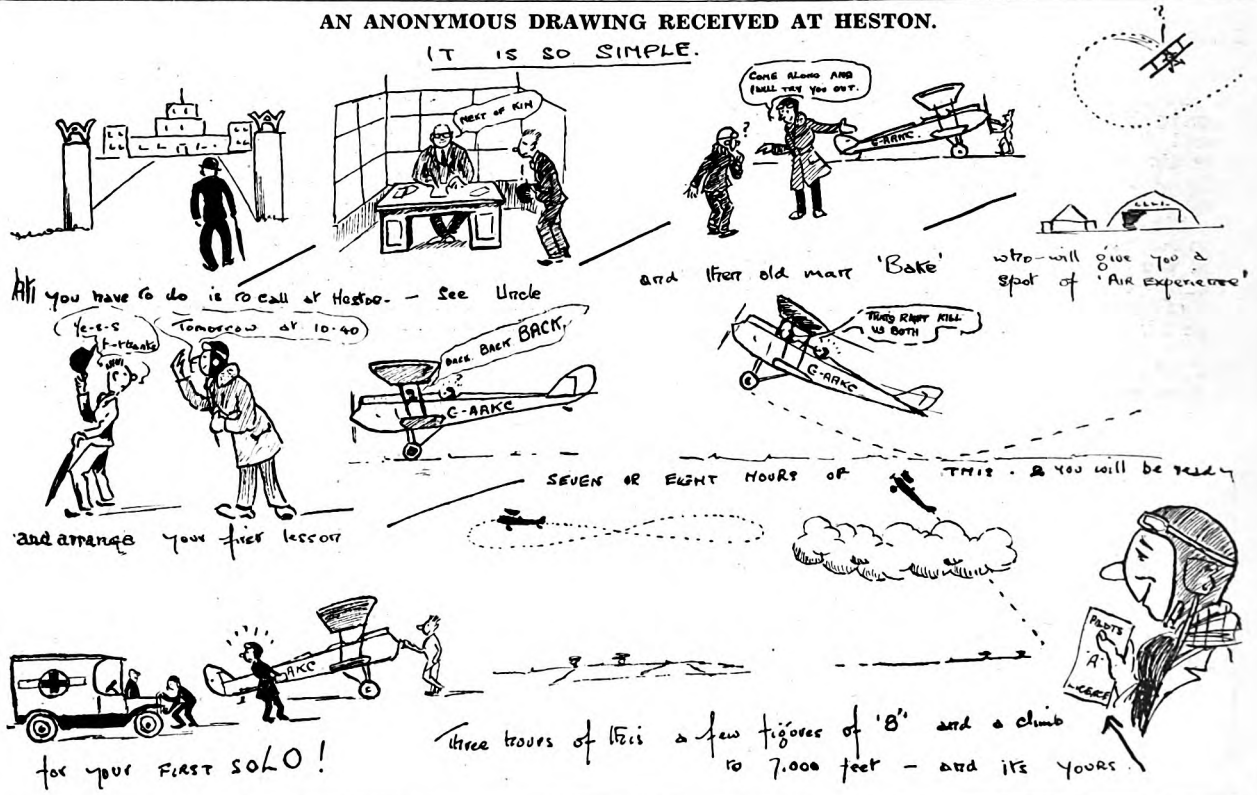
> It's a fact that the whole World knows,
> A Pobble is happier without his toes.

A private owner, however, is not happier without his licence, nor is he the better for the thick ears and other bodily harm he will get from commercial pilots if he does that sort of thing. If it gets much worse this type of pilot will be deprived of the one by the Authorities and in receipt of the other from all and sundry.

What ought to happen to him is the pillory at Charing Cross with his ears off, but, alas, we live in a foolishly humanitarian age. If, by the way, the cap fits anybody who recently flew the Channel and failed to acquaint anyone of his whereabouts for many hours when he could easily have done so, we trust he will wear it and that it will be full of highly-efficient hornets when donned.

The pilots' room at Croydon Aerodrome is, as everybody knows, surrounded with excellent caricatures of some of the pioneers of Commercial Aviation connected with Croydon which are of ever-increasing interest to commercial air line people. These drawings by Charles Dickson are the property of Barclays Breweries and it has been suggested by them that a small committee of aerodrome folk should be appointed to advise them which members of the community should be immortalised by Charles Dickson's facile pen in order that posterity should get the same sort of hearty laugh out of us that we get out of photographs or our grandfathers dressed up in top hats and bushy whiskers and banded together in one amazing group to form a cricket team.—SPRY.

**AN ANONYMOUS DRAWING RECEIVED AT HESTON.**

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### A DE HAVILLAND STUDENTS' BALL.

On Feb. 6 the Students of the De Havilland Technical School are giving a Ball in the Portman Rooms. The Reception is at 20.00 hrs. Dancing will begin half an hour later and will continue until 02.00 hrs. next day.

The Honorary Secretaries are Capt. A. T. Eadon and Mrs. Upton from whom tickets price 4s. (single) and 7s. 6d. (double) may be obtained This is bound to be a jolly affair and people should get their tickets early.

### IMPERIAL AIRWAYS FIGURES.

The receipts of Imperial Airways Ltd. for the month of November were £44,508, as compared with £38,879 for November, 1929, and the total receipts since the end of March were £445,469 as against £440,909 for the corresponding period of last year.

The miles flown in November, 1930, were 73,986, as against 82,933 for November, 1929, and the total mileage since March was 943,683 as compared with 960,010 for the same period in 1929.

### A REVISION OF RATES.

National Flying Services Ltd. announce a revision of flying rates to be effective as from Jan. 1. The principal innovation is a new rate of £2 10s. per hour for cross-country flying accompanied by an instructor, for the benefit of A licencees who wish to take a course in cross-country flying and navigation.

Dual instruction is now £3 per hour and solo instruction £2 10s. Cross-country instruction costs the same as solo. Flying by licensed members will be £2 per hour for the first 25 hours' solo on N.F.S. machines, and £1 10s. per hour after 25 hours on N.F.S. machines or 50 hours on any aeroplanes during the preceding 12 months.

Private owners may have instruction on their own machines at £1 10s. per hour.

A course of lectures on navigation, exceeding the standard for class B examinations, has been arranged and will be announced shortly Hanworth now provides a full range of instruction for Pilots' A licences, Ground Engineers' certificates and apprenticeships in aircraft engineering. From an *ab initio* start the member can qualify for a B licence, including the 100 hours' solo flying, at a cost of about £250.

### RENDERED UNTO CÆSAR.

The copyright of the photographs which appeared in the publicity pages of the Hawker Engineering Co. Ltd., numbers 1179 and 1181 in our issue of Nov. 22, belongs to *Flight*.

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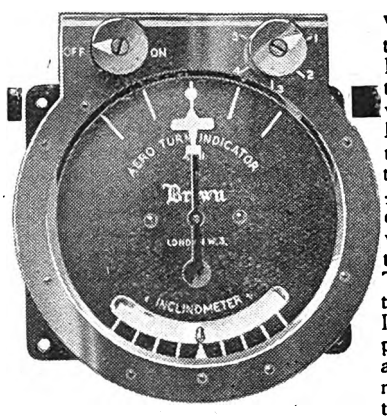
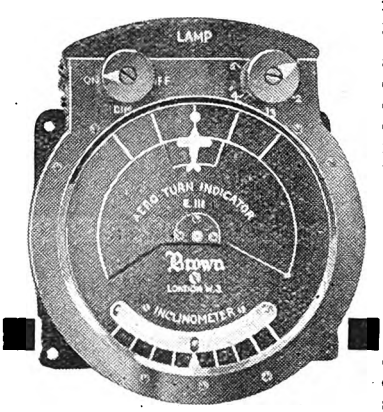
# Why Aircraft Makers are choosing the Brown Aero Turn Indicator




Within the few months the Brown Aero Turn Indicator has been on the market, it has met with swift success. Leading aircraft companies are equipping their machines with it—the latest is the de Havilland company which has chosen it for their famous Puss Moth. The reason is because the Brown Aero Turn Indicator has been proved to give greater accuracy in flight, to remove risks in fog, and to ensure a straight course by day or night.

Two Models.




The two types of the Brown Aero Turn Indicator are illustrated here. Model A (above) is air driven, and Model B is battery operated. The gyroscopic principle adopted is identical in each type. Used in conjunction with the ordinary compass, the instruments warn the pilot instantly when he is turning off his course, by means of the pointer which moves to the left or right. In addition, in the electrical model a red or green light appears. Every instrument is fitted with a control permitting five different settings for sensitivity.

Brown

AERO

TURN INDICATOR

S. G. BROWN, LTD.,
Western Avenue, N. Acton, London, W.3.

*Made by the Makers of the Only British Gyro Compass.*

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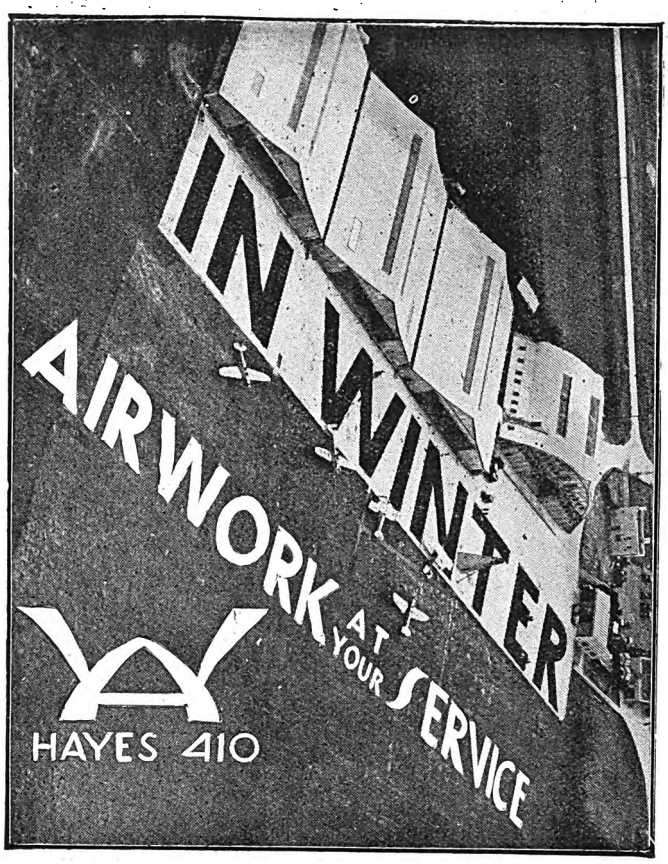

# MISCELLANEOUS ADVERTISEMENTS.

All advertisements for this column should arrive at this office by first post Monday, to ensure insertion.
For the convenience of Advertisers replies can be received at the office of THE AEROPLANE, Cannon House, Pilgrim Street, London, E.C.4.
Special PREPAID Rate—18 words 4/6, 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-, 2d. per word after. Situations Wanted ONLY—18 words 1/-. Box No. 6d. extra.

## AIR SURVEY.

**Air Survey Co. Ltd.**, 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.

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# THE AEROPLANE

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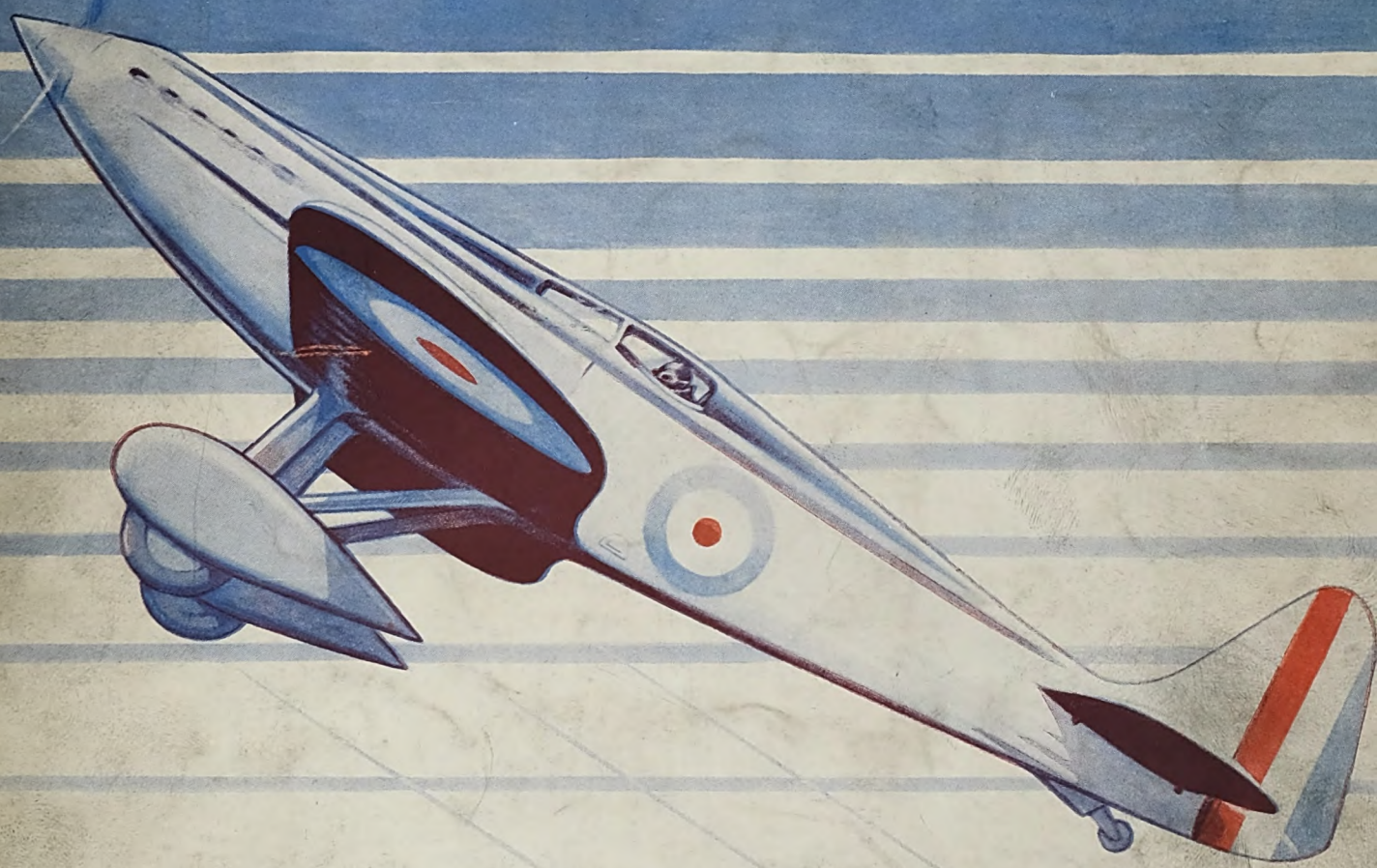

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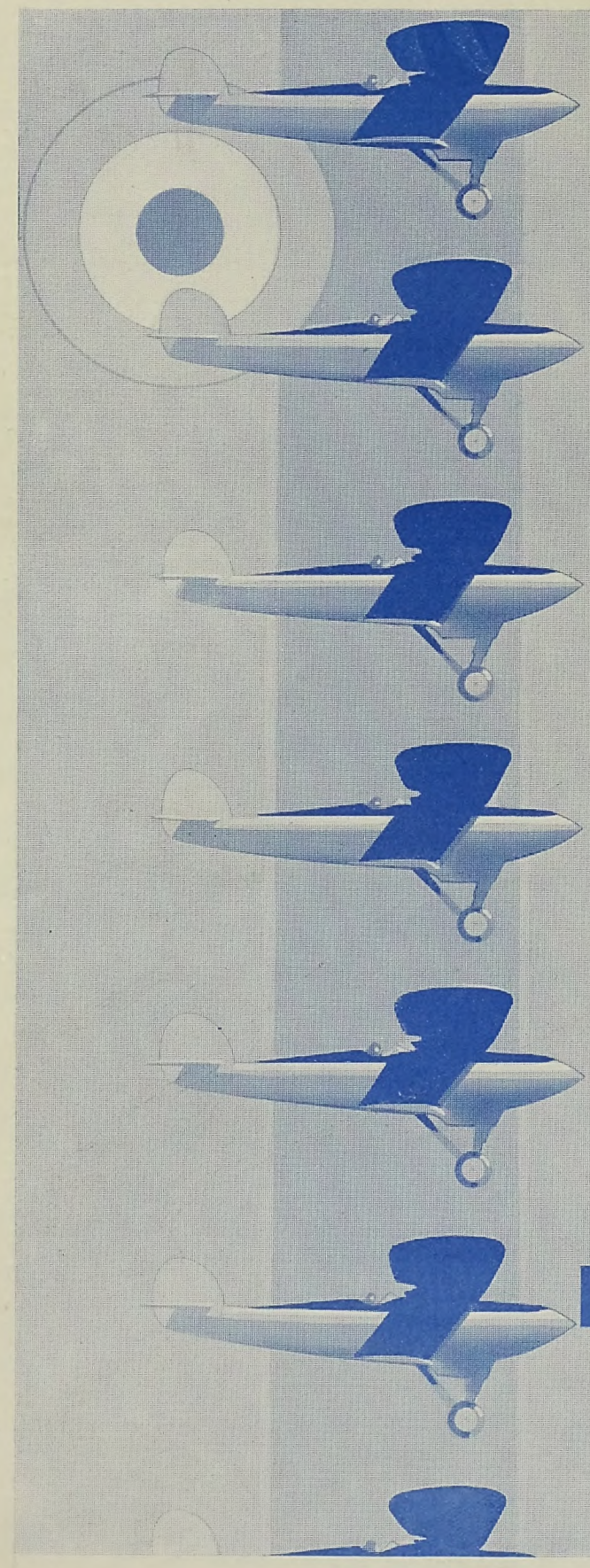

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## ON THE STATE OF TRADE.—II.

CIVIL AND SERVICE AEROPLANES.

Talking of civil aeroplanes leads us naturally to a consideration of the difference between the market for Civil aeroplanes and the market for Service aeroplanes. At the present moment certain aeroplane firms who were doing quite good business during the Summer have virtually shut down. This is very hard on the people employed, but it is inevitable.

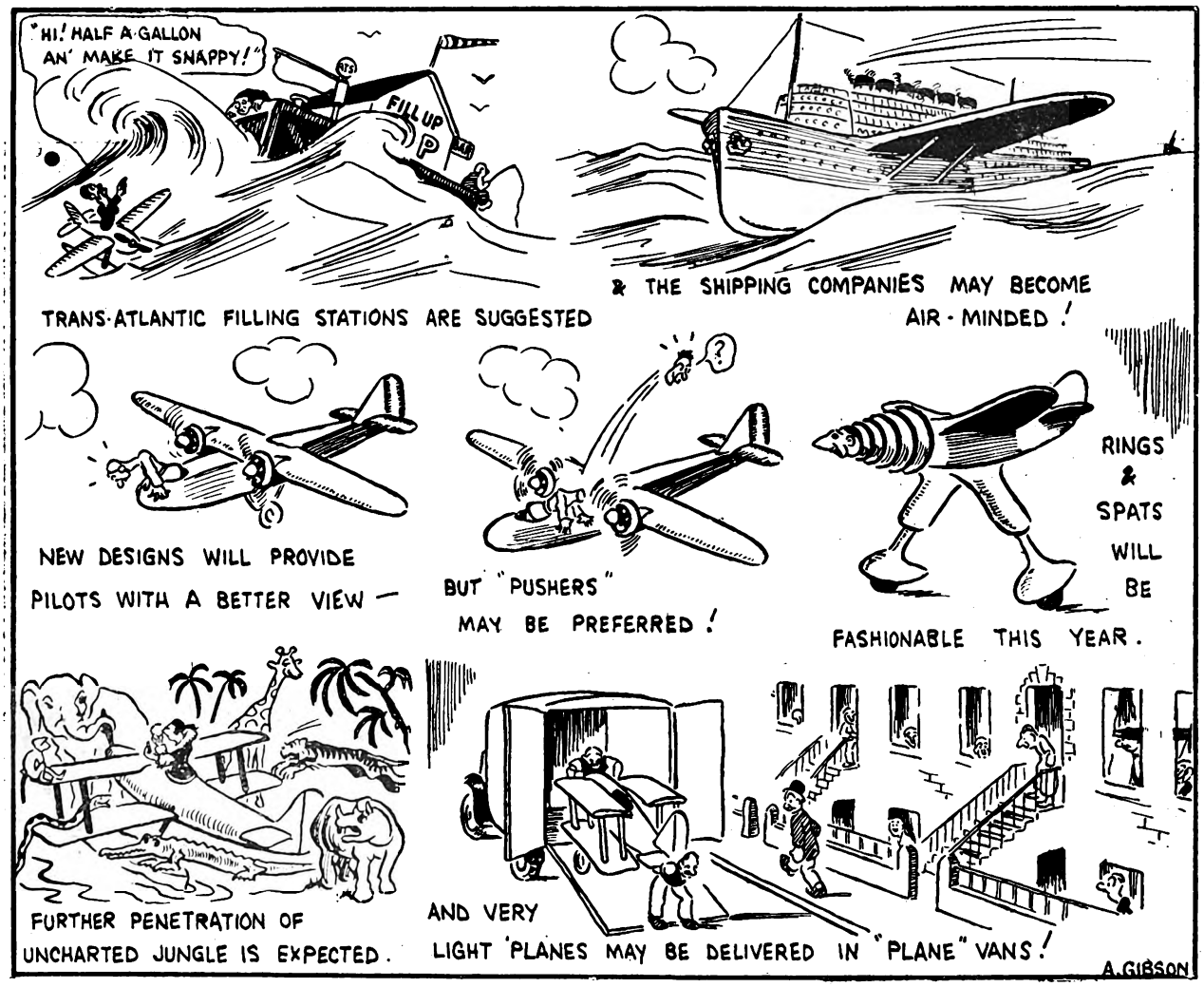
Firms which are making war machines to the order of the British Government, and of other Governments, can work all the year round because Governments do not care at what season of the year the aeroplanes are delivered. As a general rule they are wanted as quickly as possible. A nation which suddenly decides to buy the fastest fighting machines in the world, as Belgium did the other day, naturally wants to have those fastest fighting machines as quickly as it can get them. But the private owner who makes up his mind now to buy a new aeroplane probably does not really want that aeroplane till about March, or even April, next. He wants to come out with a nice, new freshly-painted unused aeroplane along with the fine weather.

Now this is a fact which the manufacturer of civil aircraft has got to face in the future. And it is a fact which people who are employed in civil aircraft factories have also got to lay to heart. They have all got to realise that the manufacture of civil aircraft is a seasonal occupation.

Some day perhaps, when we sell as many aeroplanes to South Africa, Australia and South America as we do to England and Canada and the European countries, we may be able to keep going throughout the Winter on the machines which we supply south of the Equator, and when deliveries to those countries cease we shall then begin delivery to the countries north of the Equator. At any rate, that is how it looks at first sight. But there are certain other facts to be considered and to be remembered.

---

"HE WILL BE CALLED A FOOL OR KNAVE,
"E'EN A BIGOT PLOTTING CRIME,
"WHO FOR THE HELPING OF HIS KIND
"IS WISE BEFORE HIS TIME."—*(An Unknown Philosopher.)*




LOOKING AHEAD INTO 1931.

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One is that in Australia and South Africa and South America, at any rate in those parts which are inhabited, the climate is less severe in the Winter than is ours, and, consequently, there is more flying practically all the year round than there is in the northern countries. This means that if ever the populations of those countries grow to anything like the extent of the populations of the northern countries there will be far more constant trade south of the Equator than north of it.

But this will be counteracted by the fact that north of the Equator flying will always be a seasonal occupation or sport. It will be like motoring.—or possibly even more like cycling used to be before the days of motoring. And so our New Year types will affect the markets south of the Equator, because buyers there will stop buying in the Autumn and will wait to see what our new types look like. And so work will always be slack before Christmas each year.

### The Unemployment Problem.

In these days we think more about unemployment than we did thirty or forty years ago, simply because we have a Ministry of Labour and all kinds of statistical departments, and so forth, to keep tab on the unemployed. Thirty or forty years ago we had not the faintest idea how many unemployed there were in the country, because we did not have to pay doles to them. The unemployed in those days lived on charity or in the workhouse.

The Aircraft Industry and those employed in it may find a useful lesson in the early days of the Cycle Trade as I knew it, that is to say, from about 1895 till 1905, when the Motor Trade began to upset the ordinary commercial state of the Midland cities.

The regular annual routine was roughly this. On August Bank Holiday we closed down the cycle factory for what was euphemistically called "stock taking." What it really meant was that everybody, except a dozen or two people engaged on stock-taking, went off on Bank Holiday and drew no more wages till they came back to work.

The office staff generally went off for a fortnight's holiday, or sometimes even three weeks, and, of course, they drew their wages in the ordinary way. A few people remained to answer letters, and that was all. Somewhere about the end of August we people in the drawing office began getting out drawings for new machines for the next season. If there was anything really new we had a few samples made in the tool shop. During September the hands in the factory, roughly, included the pick of the tool-room men, a few packers and fitters, who were putting machines together and packing them for transport to Australia or South Africa or India, and a few millwrights, who were overhauling the machinery and the shafting, and so forth,—in fact, putting the factory in order for the time when production should begin again.

About the end of September we would bring in a certain number of the best of our machine-tool operators, and they would set to work manufacturing those parts which we knew would not depend on next year's fashion. And during October we would build a few dozen cycles to the new designs which we had been getting out in the drawing office during September and the early part of October.

The Cycle Show was billed for November, and until the show was over we did not know what was going to be the fashion for the following year. At the Show all our agents saw what we had to offer and what our competitors had to offer. Also, we saw what our competitors had to offer, and either prided ourselves on our own foresight or kicked ourselves for our lack of foresight, according to what the other fellows produced.

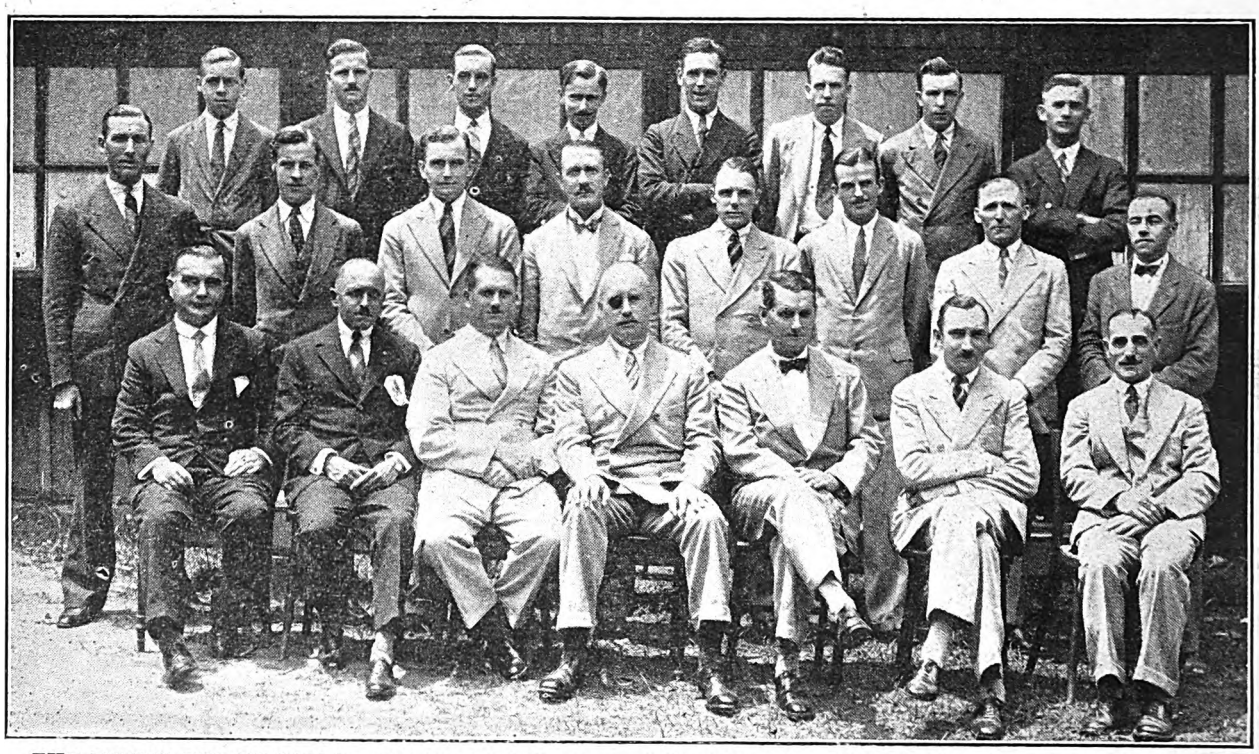
By about the middle of December we had built and delivered a fair number of our next year's type of machine to our various agents all over the country; they had exhibited them to their regular best customers and they were able, by then, to form some kind of a notion of what the demand was likely to be for the various types, and had placed their orders accordingly, and by somewhere about the middle of January, or the end of January, we were able to get all our best men back into the factory and put the works on full time.

### The Social State of 1900.

Now remember what that meant. It meant that anyhow fifty per cent. of the men employed in the cycle factories in Coventry and in Birmingham were completely out of work from the beginning of August till, anyhow, the end of December. And about 75% of them were out of work till the beginning of December. The result was that if there was any really hard weather in November and December, as there very often was, practically 30% of the working-class population of Coventry in those days were living on soup kitchens organised by charity.

There was no dole, and there was very little official provision for those out of work, other than actually going into the workhouse. Bread lines and soup tickets were regarded as being part of the ordinary economic state of the nation, just as to-day we are accustomed to seeing a string of men with their hands in their pockets lounging against the wall of the Labour Exchange on pay days, waiting to draw their dole. Both are equally lamentable sights, and both should be equally avoidable in a properly organised state of society.

In those days the really first-class workman knew that



**THE BIRD'S EYE VIEWERS.—The imported European staff of the Aircraft Operating Company, Ltd., at Rio de Janeiro, Brazil. (From left to right) Back row: Messrs. N. H. Davy, A. W. Wolfe-Merton, C. T. Peckham, W. L. Restall, J. J. McConnell, A. P. Reynolds, L. B. Intosh and C. G. Inman. Middle row: Messrs. L. E. Thevenard, F. G. King, G. M. Adams, R. Arkwright, Flg. Off. B. B. F. Russell, R.A.F.O.; Messrs. H. Ainsworth, J. Brennan and W. F. Hawksworth. Front row: Messrs. R. H. R. Tomison, C. A. Oelsner (Chief Surveyor), C. W. F. Wavell, F.R.G.S., F.S.I. (Manager), Major H. Hemming, A.F.C., F.R.G.S., A.F.R.Ae.S. (Managing Director), Mr. E. J. McAthy (Business Manager), Flt. Lt. C. A. Elliott, R.A.F.O. (Chief Photographer), Mr. G. Walker (Chief Draughtsman).**

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May we add that this letter which is quite unsolicited can be used in any way you may think fit.

Yours faithfully,

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he would be among the first to be brought back to work, and he laid by enough during the rush period to keep him comfortably during the month of August and most of September. Some of the less able men who still had some sense also laid money by, but in those days, although there was less temptation to spend money on amusements, such as cinemas and dance halls, there was more money spent on beer, and I rather fancy there was more money in proportion spent on betting. And so the unthrifty man got rid of his money just as easily as he does now.

A few men who were really handy used to drift away during the bad season to other parts of the country and get temporary jobs in other lines of business. But the great bulk of the people were far worse off during the Winter in those days than they are at present, even with our two millions unemployed.

In January, as I have already said, the factories used to be put on full time. In February and March they were working overtime, and for the two or three weeks, or sometimes even five or six weeks, before Easter, we were running a night-shift as well,—if we could get men who were competent to do the job, or if we could induce enough men to work about eighteen hours a day.

Some of the men did it, because there was less trouble with restrictions by Trade Unions in those days. And a man can work eighteen hours a day, and Sundays as well, for a couple of months on end, if he is getting double pay for Sunday work and for night work.

Money in those days was worth about double what it is now, and yet it was nothing unusual for some of our better-class men to clean up ten pounds or fifteen pounds a week. And the gang foremen, who were paid piecework for what their gang could do, and paid their men time-work, very often cleared up thirty or forty pounds a week during the busy months. Many of them became owners of streets of houses, and probably some of them are rich men to-day. Also, incidentally, some of the buyers of raw material, parts, and accessories for big firms were able to retire after a few years, also as owners of enough houses to keep them for the term of their natural lives. Either makers of raw materials were more generous then, or the Secret Commissions Act was really very necessary.

After Easter we generally ran overtime for a few weeks. But by Whitsun we were back on ordinary full time. After Whitsun we came down to short time, starting at eight in the morning and knocking off at five in the afternoon. And then again, on the first of August, we shut down flat.

### PROSPECTS FOR THE FUTURE.

Now that is very much the sort of thing that manufacturers of civil aircraft will have to do in the future. The times may vary. That is to say they may go on delivering machines even at home up till September instead of reckoning that the business is finished in August. But the private owner, or the man who is running a taxi service or a flying school and the aeroplane agent who is going to sell to the private owner will always look forward to seeing a new pattern in the new year.

Therefore we must always reckon that no aeroplanes are going to be delivered between September and about February, except for machines which are going overseas. And remember that the overseas trade is also going to drop off during the Australian and South African and South American summer, not because of the weather but because the buyers in those countries are going to make do with their existing machines until they see what our new types for the new year are going to be.

For example, who would buy a 1930 aeroplane now, after he has heard a rumour that the maker whose machine he is thinking of buying is going to produce a machine next year with, let us say, balloon tyres and brakes and a tail-wheel and an inverted engine and improved visibility, better controls all round and with a turn-indicator and a compass, and a few other odd gadgets as standard fittings all at the same price? That is only what has happened in the car trade year after year. At first makers charged extra for headlights, and for speedometers, and things like that. To-day you buy a car fitted with every conceivable luxury as standard fittings. If you want to put an extra gadget onto the modern car you practically cannot find room to put it. And, naturally, aeroplanes must follow the same line of development.

After a period of being satisfied with wheel brakes and inverted engines, and so forth, we shall develop, possibly in 1932, possibly in 1933, possibly not till 1940, a craze for good visibility, and then nobody will be able to sell an aeroplane which has a tractor screw. Everybody will want pusher-screws, everybody will want twin engines hidden away in the wings, and everybody will want all sorts of things which at the present moment are regarded as being perfectly impossible, and every year, as regular as clockwork all these improvements will be produced at the beginning of the New Year.

Fortunate people who are closely in touch with the manufacturers may be able to get them at the end of the previous year and may have the fun of flying them during the fine weather in the winter,—just as people who are in the know could get a 1931 type motor-car somewhere about June or July of 1930. But the great bulk of the buying will be done with the rise of the year. Consequently, manufacturers of civil aircraft may just as well start now to organise their sales and organise their factory arrangements accordingly.

### ORGANISED SELLING.

One important part of the sales organisation is letting the agents, and so far as possible letting the customers, know in good time beforehand what the improvements for the forthcoming year are going to be. By the time the manufacturer has got his information out to agents and customers in Australia and South America and South Africa and has got their opinions back again, something between six weeks and three months have passed. There is no good in keeping new types secret till April or March and then grumbling because somebody else gets the trade from the south of the Equator.

For the matter of that, when a manufacturer has once decided on what his next year's type is going to be the sooner he lets everybody else know all about it the better. Although people may not be buying till March or April, there is every reason why the certain buyer and the probable buyer and the possible buyer should all be told all about the latest types, so that they can get together and talk about them in their Clubs and other places where they meet.

Any firm that has got anything good to put on the market is well advised to advertise it as much as ever they can for two or three months before they expect to sell it. The more people talk about it the more the psychological momentum in its favour grows and the bigger must be the trade at the finish.

There are two arguments about selling. Some people like to wait till they have got a lot of stuff in stock and then advertise it as hard as they can, and throw it on the market in a mass so as to produce a sudden mass momentum in its favour. Other people like to start and work up that mass momentum gradually, getting people to talk, keep on advertising the thing to make people talk, and so getting up an accumulative effect and getting people to come and enquire and want the thing before they can actually have it.

That latter always strikes me as being a very sensible method, because nothing makes anybody want a thing so much as not being able to get it at the moment. Therefore, if I were a manufacturer and owned anything fresh that I wanted people to buy in March, I should certainly start telling them all about it as early as possible in January, after they had settled down from their Christmas holiday.

### AIR TRANSPORT AND EXPANSION OF TRADE.

There is just one other aspect of the future of the Aircraft Industry which is worth discussing quite briefly. The general trade depression from which we are suffering can best be overcome by quick communication. The people who have accumulations of goods to sell must get in touch with the people who want them and who have goods which they can exchange for them. There is no better method of speeding business communication than air transport of mails and samples. For example, those firms in this country who do business in South America are full of the benefits they derive by quick communication, thanks to the French Aéropostale Line. There are even firms in this country who have benefitted by using the Imperial Airways Mail Service to India and 'Iraq and Egypt.

When air transport is a little more developed, when aeroplanes are a little more reliable and a little simpler to handle, we shall find still greater benefits from air transport in our Dominions and Colonies. Already in Australia people living in the back-blocks and out beyond the railways in Queensland and in Western Australia are finding themselves much more closely in touch with civilisation because of the excellent postal services and passenger services in time of emergency offered by the Quantas Line and West Australian Airways.

People who formerly were six weeks or a couple of months' journey from civilisation now find themselves within a few hours of it, and people who in case of illness could not get a doctor at all can now get a doctor within a few hours, thanks to the ambulance service which is operated by these air lines.

A very slight extension of air service of that kind means that people will live out in the wilds where they would never have thought of living even five or ten years ago. There may be practically no roads and no railways, but anything within a hundred miles is within an hour's flying, and a hundred miles out in the bush is a very long way without air transport, but a very short way with air transport.

Actually, rapid transport by road and air in the British Isles, and rapid transport by motors without roads and by air in the Dominions Overseas, is ultimately going to solve some of the greatest of our industrial problems.

People will not live in the country when they are out of

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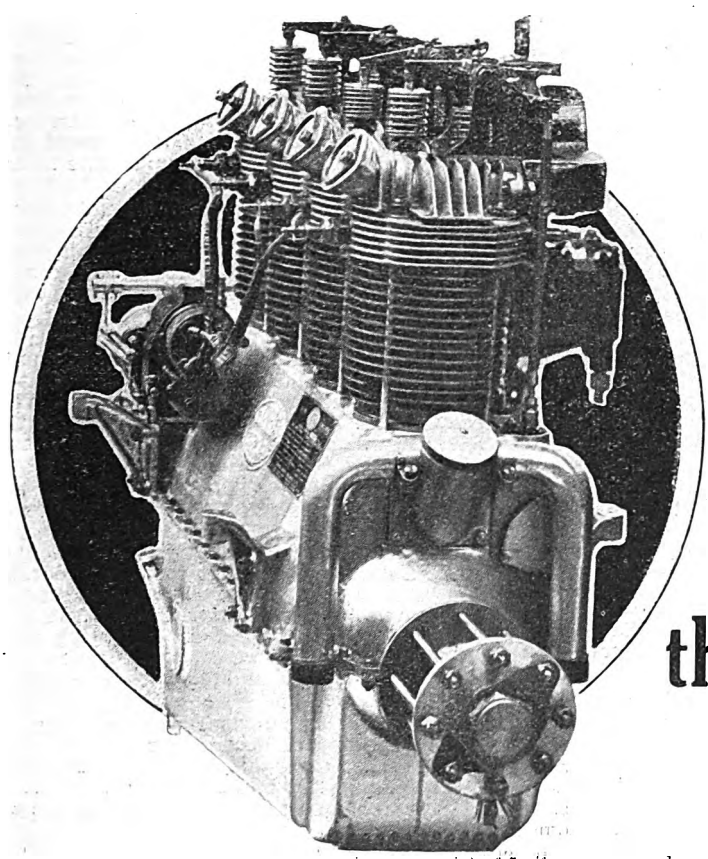

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touch with town and amusement. People will not mind living in the country when within an hour or half an hour they can get to a place of amusement where they can meet their own kind. Similarly, with the improvement of air transport, people will live in the wilds quite happily, knowing that they can get to civilisation in an hour or two.

Thus our worst social problems will be ultimately solved. So let us hope that not only may our aircraft manufacturers give us better visibility out of their new aeroplanes, but that those who rule over us, and those who finance our great business undertakings, may have better mental vision in 1931. Let us hope that besides merely seeing on which side their bread is buttered, they may see some way along the strait and narrow path of progress.—C. G. G.

## THE FIRST ESSENTIAL FOR THE DEVELOPMENT OF FLYING IN BRITAIN.

BY SIR ALAN J. COBHAM.

Until such time as every town in the British Isles has an aerodrome, there is little hope of the general adoption of flying as an everyday means of transport by the public.

If one possesses an aeroplane to-day, one's sphere of action is limited to flying between such places as have aerodromes. There is little utility and not much pleasure in flying to towns which have no aerodromes. There may be a certain amount of adventure in landing in a field which is an unknown quantity, but after all one has no right to land in a farmer's field uninvited and, having done so, the inconvenience very soon outweighs the pleasure of the flying trip prior to the descent.

Assuming that one wishes to visit a particular town, one flies to that place hoping to find a suitable field nearby, and, having alighted in what appears to be a moderately open field, one probably bumps over unforeseen undulations and hollows and the light plane eventually comes to rest. Possibly no one has seen the descent. The aeroplane is left to look after itself whilst one climbs over various hedges and ditches in order to reach a roadway where, if one is lucky, it may be possible to stop a passing car or horse-drawn vehicle which will convey one into the village where one may be able to purchase a certain amount of petrol in cans and, after much time has been lost, someone will convey the tins at great inconvenience to the machine.

Perhaps on return one will find that cows—unknown and unseen on arrival—have now broken through hedges and have surrounded the machine. Out of sheer curiosity they may have sampled the rudder and found the flavour of the Cellon or Titanine Dope very delightful, inasmuch as the rudder is now in shreds and the ailerons buckled.

Whilst one is viewing this sorry spectacle a very annoyed farmer arrives on the scene and wants to know why a landing has been made in his field. After telling him a reason of sorts, by his kindness one is allowed to store the machine for the night prior to repairs being made.

This may be an extreme case, but it is an example of flying in the British Isles to-day, that is if one wishes to fly to any place where there is no aerodrome.

The market for light aeroplanes up to the present has been mainly for various Governments throughout the World who require a light aeroplane as a kind of inexpensive stop-gap machine to supply their needs for flying at the moment. Then there are the sporting women and men who love to fly under any conditions and are quite prepared to put up with the limited sphere of action through having to fly only to the existing aerodromes, or to land in odd fields outside various towns, either by arrangement with the owners or without any permission at all.

We all know that this kind of thing cannot go on for ever, and that the question of facilities for aircraft in the various towns at present is most haphazard and that proper provision must be made in the near future.

It takes little imagination to realise the great utility of the aeroplane if we visualise the possibilities of flying, assuming that every town throughout the country had a landing ground. Under these conditions, it would be possible to fly in a straight line from anywhere to anywhere, in fact we could get about the country by air in exactly the same manner—so far as facilities are concerned—as we can to-day by car. The great advantage is that we should short-circuit the car twenty times over.

From the utility aspect the possibilities of the private-owner machine, the aerial taxi, and special chartered aeroplane, are unbounded when every town has its own aerodrome.

The first stage of development for an aerodrome at present simply means a hangar with an engineer and possibly pilot in charge, and of course an odd aeroplane ready for taxi work. These arrangements can easily be made if the Municipality provides the landing ground, for private enterprise will do the rest.

I have always visualised that if every town had an aerodrome there would be an opening for a qualified ground engineer and licensed pilot. Private enterprise would spring up in every town, and the local garage proprietor would have his aerial garage, and employment would be created for many of the R.A.F. personnel who have retired from the Air Force.

It is natural that the Air Taxi services will be the forerunner of permanent air routes, as they will be feelers that will indicate where aerial communications are needed.

However the whole proposition is bound up in one thing alone "An aerodrome for every town."

It seems that a boom in the Aircraft Industry will come about when proper ground facilities are provided at every town throughout the country, and from this we may deduce that the aerodrome movement is the key to the development of the Aircraft Industry.

Up to the present we have been fortunate in exporting our aircraft all over the World, but I maintain that the backbone of any industry is the home demand, and therefore, provided that we have a big home demand for aircraft, we shall then be in a position to maintain a supremacy of the aircraft export business.

Assuming that aerodromes are the one essential at the moment, the point in mind is to ascertain how we can procure these aerodromes.

In view of the fact that so many municipalities have made enquiries, formed Committees, have even acquired sites for landing grounds, we may safely assume that a town's aerodrome is a municipal responsibility. Municipal Airports are on the same basis as any other development proposition for transport, such as a road or bridge, a dock or a harbour, and the town which lags behind in the development of its airport will not be up-to-date in its future development.

Assuming that the town's airport is a municipal responsibility, it is evident that each municipality should ascertain which is the best possible site for its future airport, as it is desirable to acquire the best piece of land for aerodrome development as near as possible to the centre of the town.

The best site for a town's future municipal airport is an all-important question. Should the wrong site be acquired and developed and, at a later date should the municipality find that the land is unsuitable, impractical, or that a better site exists, the Authorities would be placed in a very awkward predicament. They would be aware that they had made a blunder which would be very difficult to rectify in view of the vested interests which would speedily develop on the municipal aerodrome site.

I maintain that it is essential that the environs of every town throughout the British Isles should be searched and reported on immediately by an expert, who would advise regarding the existence of the best possible aerodrome sites. This should be done without delay because of such developments as housing estates, new arterial roads, overhead high tension cables, etc. which are daily destroying good aerodrome sites. If these sites were known, the roads, cables and planning schemes could be diverted and the valuable aerodrome sites reserved.

The development of a municipal aerodrome is not a rash scheme. The majority of expenditure is taken up in the purchase of land, which should be a sound investment because should flying go out of fashion a suitable aerodrome site would always make a very excellent housing estate, and come in for a dozen other uses.

In selecting an aerodrome site there are many things to be borne in mind, and, although a tract of land may be suitable for the alighting and taking off of aircraft as we know them to-day, we must consider what will be needed for the air traffic in twenty or thirty years' time.

Also we must visualise how the planning of the layout of hangars, workshops, arrival sheds, control towers and general airport accommodation, can best be developed.

There are many sites which when first viewed appear suitable. But when the lay-out of the site as an airport for the future is considered, we often find that it is quite impracticable.

I feel that the all-essential for the encouragement of flying in Britain during 1931 should be to urge a movement throughout the country for the development of a landing ground for every town.

## A RUSSIAN ACHIEVEMENT.

On Sept. 9 three military aeroplanes of the Union of Soviet Socialist Republics returned to Moscow after a flight to Angora, Teheran, Kabul and back again. The journey occupied two weeks only, and in view of the technical—and political—importance of the feat it has been greeted with considerable enthusiasm in Russia.

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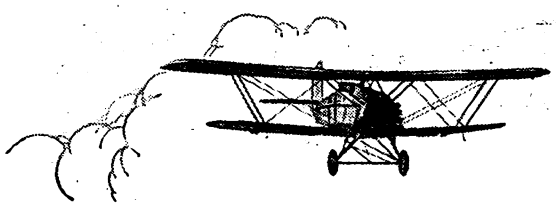

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SIR W. G.

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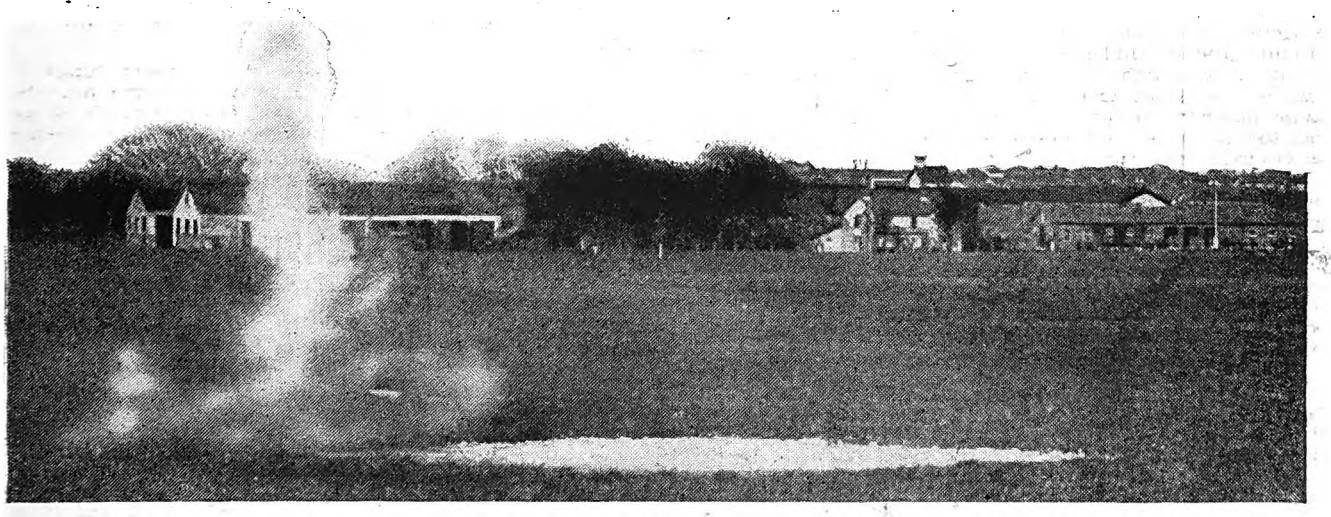



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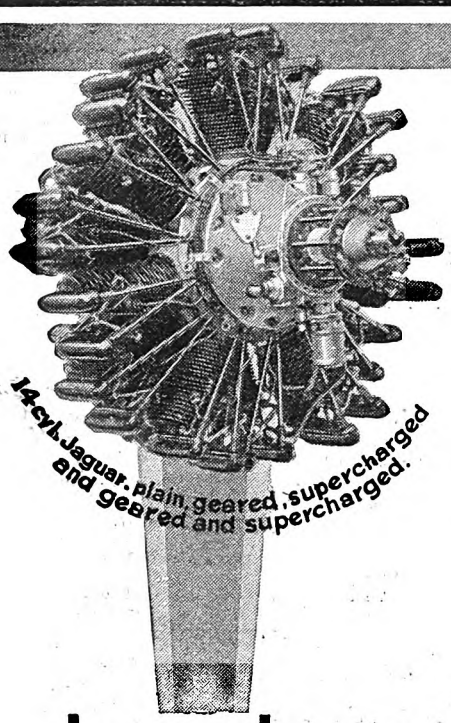


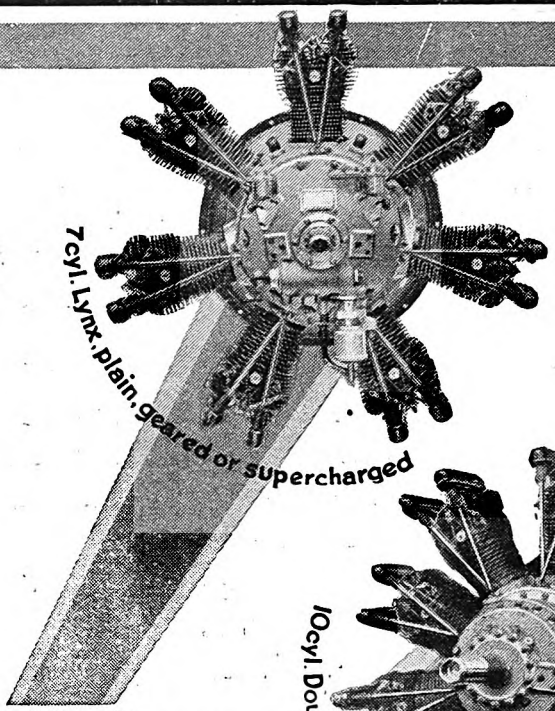


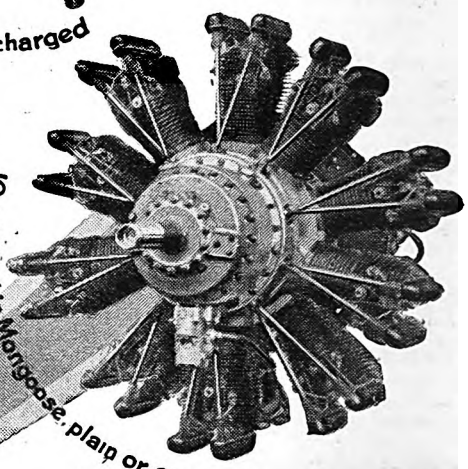


# Interchangeability of Parts

Interchangeable parts of the Jaguar, Lynx, Mongoose and Double Mongoose are the cylinders, pistons, auxiliary connecting rods, front cover, airscrew boss, hand starter and primer pump. Additional parts interchangeable on the Jaguar and Lynx are the oil pump, master connecting rod, gas distributor and timing gear.

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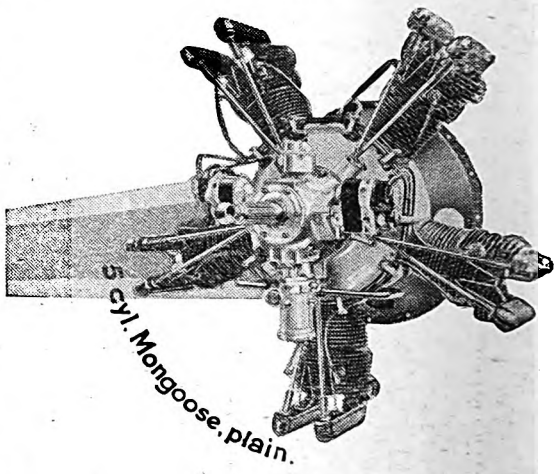


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# THE ROYAL AIR FORCE.

## The London Gazette.

*Air Ministry, December 23.*

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off. (Oct. 14):—H. E. Mayes, C. S. Millar, R. Smith. Flg. Off. G. Fachiri resigns his S.S. Comn. (Dec. 10); the S.S. Comn. of Plt. Off. on probation R. O. F. King is terminated on cessation of duty (Dec. 23); Lt. G. R. F. T. Cooper, R.N., Flg. Off., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (April 23) (substituted for the notification in the *Gazette* of April 22); Lt. R. H. Barrett, R.N., Flg. Off., R.A.F., relinquishes his Temp. Comn. on return to Naval duty (Sept. 25).

Flg. Off. F. Read is dismissed the Service by sentence of General Court Martial (Dec. 16); Flg. Off. H. W. Charnock is cashiered by sentence of General Court Martial (Dec. 12).

MEDICAL BRANCH.—Flt. Lt. V. V. Brown, L.R.C.P. and S., is transferred to the Reserve, Class D (ii.) (Dec. 21).

CHAPLAINS' BRANCH.—The Rev. R. E. V. Hanson, O.B.E., M.A., relinquishes his appointment as Hon. Chaplain to the King on retirement from the R.A.F. (Dec. 11).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Plt. Off. on probation M. J. Creswell is confirmed in rank (Dec. 11).

The following are transferred from Class A to Class C.:—Flt. Lt. A. M. Blake, A.F.C. (Sept. 16); Flg. Off. C. Thomas (Dec. 23); Flg. Off. C. F. Roupell (Dec. 3).

Flg. Off. A. F. Fleetwood-Lawton is transferred from Class AA (ii.) to Class C (Dec. 20).

The following relinquish their Comns. on completion of service:—Flt. Lt. E. E. Deans, D.S.C. (Oct. 24); Flg. Off. H. C. E. C. P. Dalrymple (Sept. 2).

The following relinquish their Comns. on completion of service and are permitted to retain their rank:—Sq. Ldr. J. R. Howett (Oct. 24); Flg. Off. L. S. Punnett (Oct. 12).

STORES BRANCH.—Flg. Off. W. A. Kyte relinquishes his Comn. on completion of service and is permitted to retain his rank (Sept. 12).

MEDICAL BRANCH.—Flg. Off. R. S. Maclatchy relinquishes his Comn. on completion of service (Aug. 11).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—The following to be Plt. Off.:—N. T. Tangye (Oct. 25).

## Appointments.

*Week ending December 30.*

The following officers are all posted to R.A.F. Depot, Uxbridge, on transfer to Home Establishment with effect from the date indicated:—

GENERAL DUTIES BRANCH.—Wing Commander T. E. B. Howe, 22/11.

Flight Lieutenants C. N. H. Bilney, 14/11; J. B. H. Rogers, 14/11; J. E. L. Drabble, 24/11; C. Feather, 14/11; V. P. Feather, 19/11; R. N. Waite, 21/11; H. M. Groves, 14/11; W. H. Burbury, 14/11.

Flying Officer H. G. Wheeler, 14/11.

MEDICAL BRANCH.—Wing Commander H. B. Porteous, 3/12.

Flight Lieutenants F. E. Lipscomb, 18/11; J. H. Cullinan, 18/11.

Flying Officer W. King, 18/11.

STORES BRANCH.—Squadron Leader P. J. Murphy, 19/11.

Flying Officer J. F. Young, M.M., 19/11.

## Royal Air Force Cadetships.

The following are declared by the Civil Service Commissioners to be the successful candidates at the competitions held in November for Air Cadetships. The names are in order of merit:—

Kite, D. S., Bray, A. N., Nelson, E D. M., Brotherhood, W. R., Parish, M. J. O., Salter, P. S., Bertram, H. L. J., Stone, R. G., Pemberton, D. A., Barclay, R. A. C., du Boulay, J. F. H., Knights-Whittome, R. J., Smith, R. T., Furze, D. H., Rogers, P. J. P., Bax, A. R. G., Powell, A. G., Bradford, R. L., Murdoch, W. H. B., Coulson, L.

King's Cadet who has qualified for Cranwell.—MacKay, I. G.

Honorary King's Cadets who have qualified for Cranwell.—Hurndall, J. W. W., Hastings, M.

## Vacancies for Accountant Officers.

The Air Ministry announces that an examination will be held in the latter part of March, 1931 under the scheme inaugurated in 1924 for the entry into the Accountant Branch of the R.A.F. of qualified and experienced civil accountants. About 5 vacancies are likely to be available. The age limits are 22 to 26.

The competition will be held in London by the Civil Service Commissioners and will include (1) an examination in book-keeping and accountancy (excluding partner-

**ACTIVE SERVICE.—A formation of Westland Wapitis (Bristol Jupiter VIII F engine) of No. 39 (Bomber) Squadron, R.A.F., returning from operations over the Kohat Pass. The Squadron is commanded by Sq. Ldr. S. B. Harris, D.F.C., A.F.C.**

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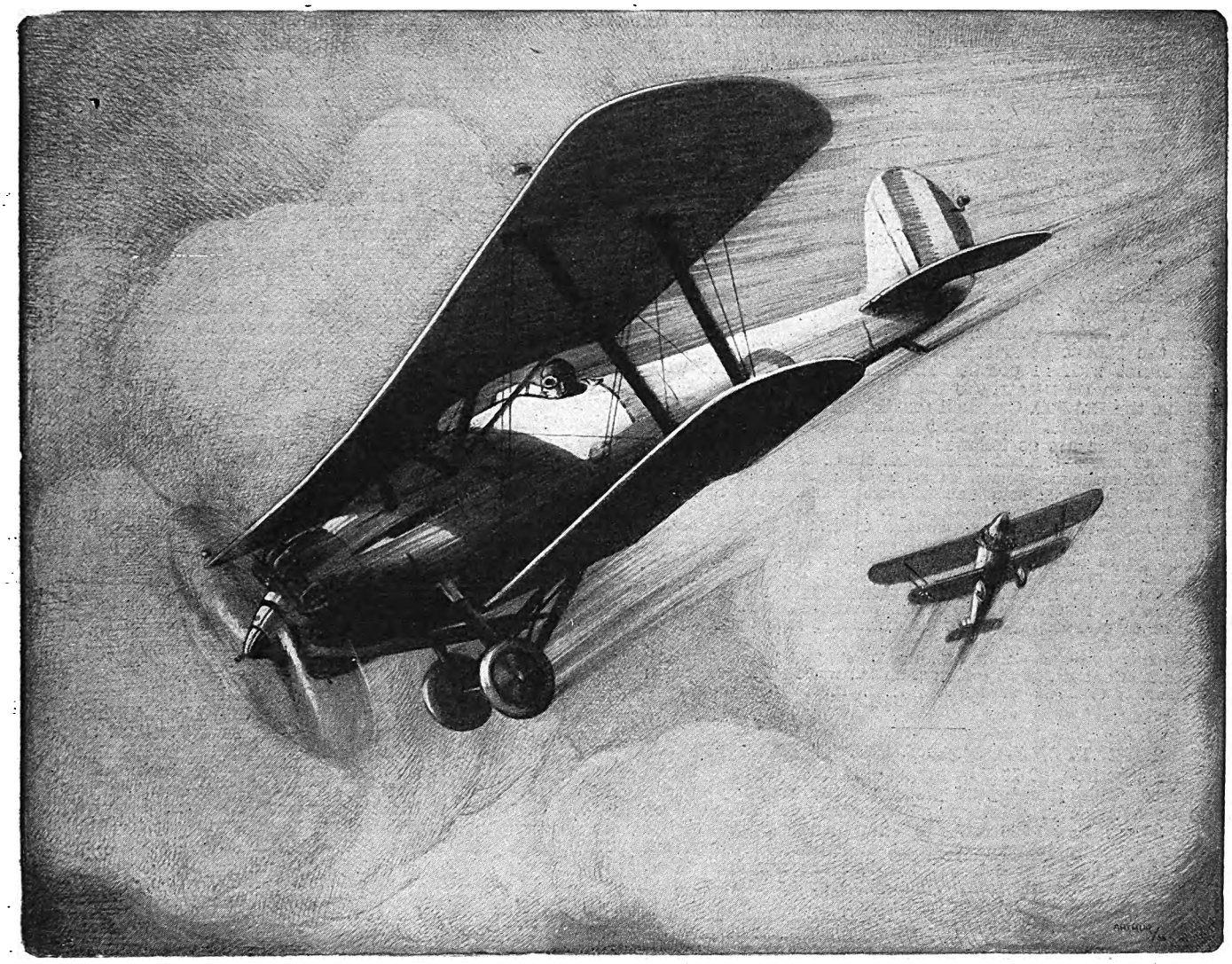

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On Nov. 8 the Rifle Team Championship was shot off and out of 12 teams entered, No. 4 F.T.S. "L-Z" were the winners with a total score of 1,073 out of a possible 1,600, with No. 4 F.T.S. "A-K" second with a score of 1,070. The winners and runners-up teams were composed of the following:—

*No. 4 Flying Training School "L-Z"*: S-M. Loughhead, W. J.; Flt. Lt. J. R. Tindall; Sjt. Palfreman, J. E.; Sjt. Shawcross, J.; Sjt. Payne, L. F.; L-AC. Odell, W. S.; Sjt. McRae, J. A.; Flg. Off. M. Lowe.

*No. 4 Flying Training School "A-K"*: Flg. Off. I. G. E. Dale; F-S. Fretwell, S.; L-AC. Christian, J. W. E.; Plt. Off. H. J. L. Hawkins; Cpl. Brown, L. G.; L-AC. Bexley, L. H.; Cpl. Hamilton, A.; Sq. Ldr. F. P. Adams.

No. 208 (AC) Sqdn. and No. 47 (B) Sqdn. were third and fourth respectively.

### The Lafferty Cup.

The Lafferty Cup, for which an annual competition is held between the R.M.A. College, Woolwich, the R.M.C. Sandhurst, the R.A.F. College, Cranwell, the R.M.C. of Canada and the R.M.C. of Australia, has been won this year by Sandhurst with 14 points. The R.M.C. of Australia were second with 11½ points, the R.M.A. Woolwich, third with 10 points, the R.A.F.C. Cranwell fourth with 5½ points, and the R.M.C. of Canada fifth with 5 points.

The details are as follows:—

*1½ Miles Relay.*—1, R.M.C. of Australia, 5 min. 23 7-10 sec., 7 points; 2, R.M.C., Sandhurst, 5 min. 24 2-5 sec., 5; 3, R.A.F.C., Cranwell, 5 min. 38 1-5 sec., 3; 4, R.M.A., Woolwich, 5 min. 41 4-5 sec., 1; 5, R.M.C. of Canada, 5 min. 48 3-5 sec., 0.

*Mile Race.*—1, R.M.C. of Australia, 4 min. 34 5-10 sec., 4 points; 2, R.M.A., Woolwich, 4 min. 38 1-5 sec., 3; 3, R.M.C., Sandhurst, 4 min. 38 4-5 sec., 2; 4, R.A.F.C., Cranwell, 4 min. 50 4-5 sec., 1; 5, R.M.C. of Canada, 4 min. 52 3-5 sec., 0.

*High Jump.*—1, R.M.A., Woolwich, 5 ft. 8 in., 4 points; R.M.C., Sandhurst, 5 ft. 7½ in., 3; 3, R.M.C. of Canada, 5 ft. 6¼ in., 2; 4, R.A.F.C., Cranwell, and R.M.C. of Australia, 5 ft. 5 in., ½ a point each.

*50 Yards Swimming.*—1, R.M.C., Sandhurst, 25 1-5 sec., 4 points; 2, R.M.C. of Canada, 26 3-5 sec., 3; 3, R.M.A., Woolwich, 28 5-10 sec., 2; 4, R.A.F.C., Cranwell, 29 1-5 sec., 1; 5, R.M.C. of Australia, 29 4-10 sec., 0.

## THE ITALIAN ATLANTIC FLIGHT.

The squadron of Italian seaplanes under General Balbo reached their jumping-off place for the crossing of the South Atlantic on Christmas Day. They left Kenitra on Dec. 23 and flew 1,200 miles to Villa Cisneros. One of the spare machines failed to take off at the first attempt and was towed back to port, but followed the squadron later. All fourteen set off from Villa Cisneros on Dec. 25 and arrived at Bolama, Portuguese Guinea.

Stormy weather was encountered on the way, and one report says that several airscrews will have to be replaced before the Atlantic crossing can be attempted. A general overhaul is now under way, and the take-off for Port Natal, Brazil, is planned for Jan. 5.

Each of the twelve machines will carry 3½ tons of petrol and 350 lbs. of oil. The two spare aeroplanes will not go beyond Bolama.

## THE DIRECTOR OF CIVIL AVIATION.

An evening newspaper recently announced that Air Marshal Sir Geoffrey Salmond, K.C.B., K.C.M.G., D.S.O., Air Officer Commanding, R.A.F., India, was to be appointed Director of Civil Aviation. THE AEROPLANE has good reason to contradict this announcement, and is glad to be able to state that the Royal Air Force will not lose Sir Geoffrey Salmond's services yet, as he has refused the appointment.

From the point of view of Civil Aviation, the appointment of Sir Geoffrey Salmond as its Director would have been ideal. He might justly be called the Father of the Light Aeroplane movement, because he was in fact the instigator of the first Light Aeroplane Competition at Lympne in 1923, as he persuaded the Air Ministry to organise the contest.

He was also directly responsible for the London—Karachi Air Route and was himself a passenger in the first aeroplane to fly from England to India, when he was G.O.C. Middle East Area, in 1919. Furthermore, when A.O.C., 'Iraq, he was concerned with the marking of the Desert Route from Amman to Baghdad.

He would have made an excellent D.C.A., and his refusal is to be much regretted for he has always shown great foresight in all things pertaining to aviation.

## THE NEW FRENCH AIR MINISTER.

M. Paul Painlevé has been appointed Air Minister in M. Steeg's Government in succession to M. Laurent Eynac, who, by his long service under successive Governments, had almost come to be regarded as a permanent Air Minister.

M. Painlevé was one of the first Frenchmen to fly. He had his "baptism of the air" with Wilbur Wright in 1908 at the Camp d'Auvours and later the same year he flew as passenger with M. Henry Farman at Mourmelon.

## MEXICAN EQUIPMENT.

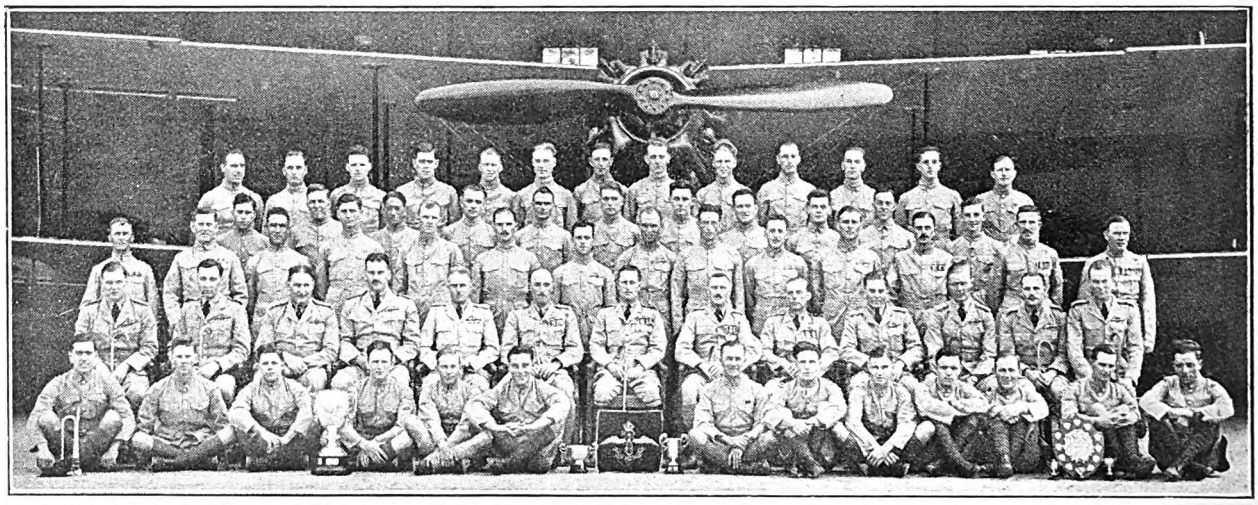
The Mexican Government, through General Juan F. Azcarte, Chief of its Army Air Corps, and Lieut. Villarreal, have just placed an order for immediate delivery of seven Fairchild KR-34s 3-place training planes.

Thirty-eight of these craft are now owned by the Canadian Government, thirteen of which have been delivered this year. Eight of the 71s are being delivered to the U.S. Army for photographic work. Eight are now in use in Chile. One is in use by the Japanese Army.

## AEROPLANE POSTCARDS.

Two sets of "Aeroplane" postcards are now available and may be had on application to the Photographic Department, THE AEROPLANE, 175, Piccadilly, W. Set "A" consists of the Sidestrand, the Hart, the Bulldog, the Wapiti, the Fairey IIIF. and the Horsley. Set "B" consists of the Fury, the Firefly, the Ripon, the D.H. Intercepter, the Gnatsnapper and the Fox.

Each machine is flying. The postcards are 2s. a set post free.



**DIE NOCTUQUE.—A Christmas card of the personnel of No. 39 (Bomber) Squadron, R.A.F., taken at Risalpur, N.W.F.P., India, last October. The names are: (Back row) L-AC. Jamieson, L-AC. Huscroft, L-AC. Ballantyne, L-AC. Ravenscroft, AC.1. Gibson, AC.1. Barton, L-AC. Coombes, L-AC. Davis, L-AC. Lovell, AC.1. Pannell, L-AC. Staples, AC.1. Lathe, L-AC. Thurston. (Third row) L-AC. Hayward, Cpl. Gentry, L-AC. Hinings, AC.1. Tills, L-AC. Hogan, L-AC. Davidson, AC.1. Drew, L-AC. Hayman, L-AC. Bennett, L-AC. Guiver, L-AC. Hodson. (Second row): F-S. Farran, Sjt. Addis, Cpl. Llewellyn, Cpl. Oldfield, Cpl. Shaw, Cpl. Harrison, Sjt. Whitwell, Sjt. Wren, Sjt. Eldridge, Sjt. Woodcock, Sjt. Gowing, Sjt. Nunneley, Sjt. Lochead, F-S. Hepple. (First row): Flg. Off. Collings, Flg. Off. Lobley, Flg. Off. Pearson, Flg. Off. Ryley, Flt. Lt. Dipple, Flt. Lt. Lea-Cox, Sq. Ldr. S. B. Harris, D.F.C., A.F.C., Flt. Lt. McKeever, Flg. Off. Lowry, Flg. Off. Wheeler, Flg. Off. Blain, Flg. Off. Davidson, Flg. Off. Watts. (Front row): L-AC. Appleton, L-AC. Wright, L-AC. Roe, L-AC. Blenkinsope, L-AC. Henderson, L-AC. Ellis, L-AC. Westwood, AC.1. Gorring, AC.1. Rootes, L-AC. Andrews, AC.2. Girling, L-AC. Blake, L-AC. Lee.**

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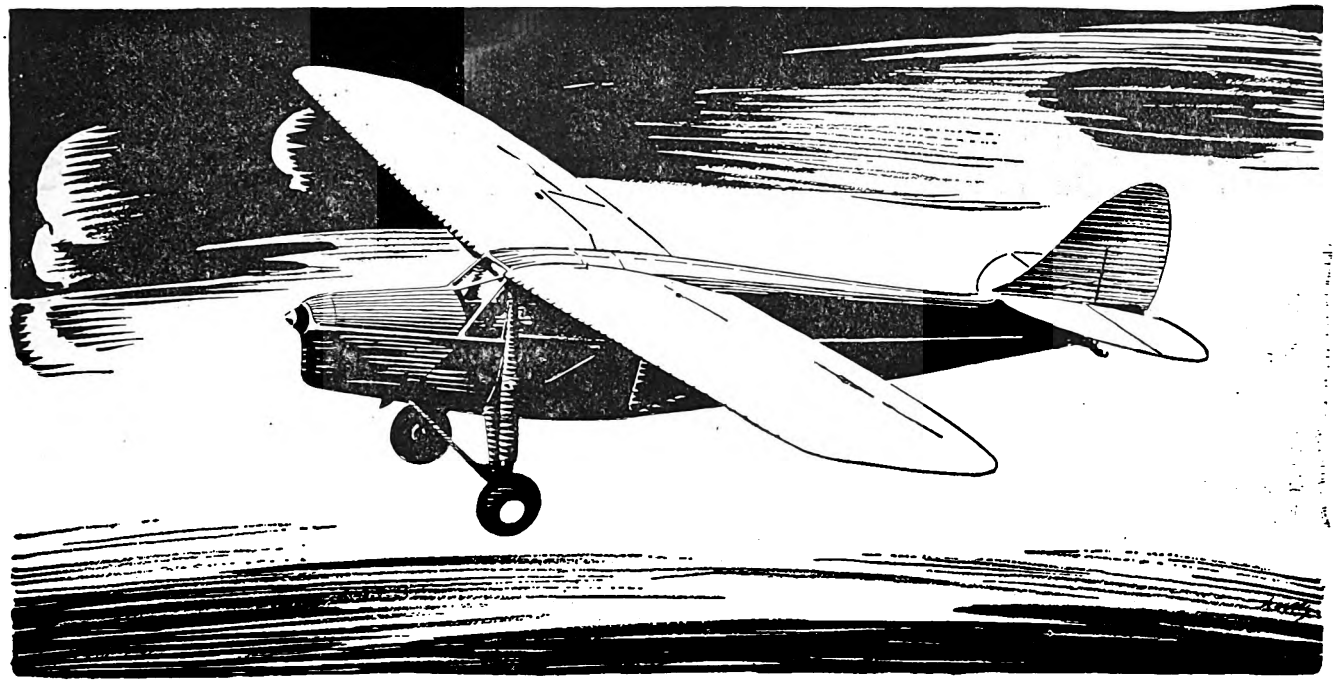

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Its special features comprise:

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Top speed: 128 m.p.h.

Cruising speed: 100-110 m.p.h.

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Initial rate of climb: 800 ft./min.

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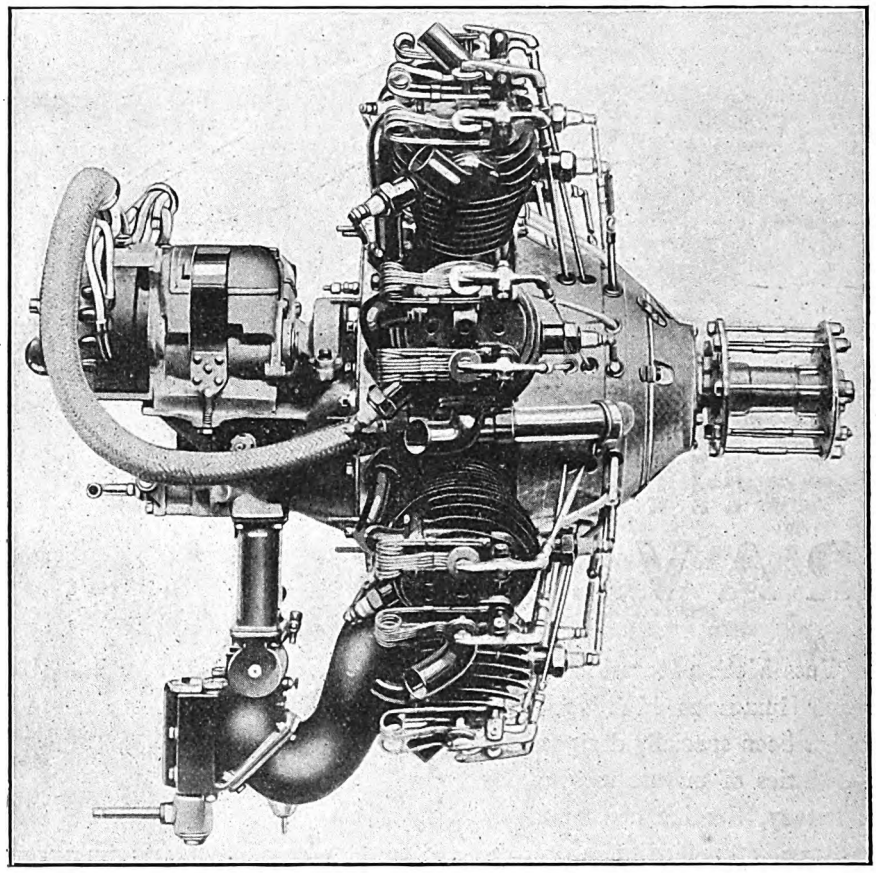

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

# SOME GROUND ASPECTS OF AVIATION.

On Dec. 1 a paper by Captain W. R. Baldwin-Wiseman, M.Sc., Assoc.M.Inst.C.E., F.S.I., was read before the Society of Engineers, by whose kind permission the paper is now reprinted.

Captain Baldwin-Wiseman opens his paper by outlining the growth of aviation from the first flight by Orville Wright in 1903 to the present day. He explains that since the Armistice the aeroplane has been increasingly used for rapid communications; expediting mail services; making possible comparatively cheap photographic surveys of large areas; facilitating transport over sparsely populated and undeveloped districts; affording means of patrolling forest and swamp areas; controlling and eradicating agricultural pests; combating forest fires, and affording prompt relief to marooned victims in flooded areas.

He points out that though in England the well-developed and extensive road and railway systems and good coastal steamship services, the limited extent of the country, the grouping of industries in restricted areas and similar causes, have all militated against development, this slow stage of growth must soon pass and be followed by intensive progress.

He then quotes figures to show the growth of aviation throughout the World, which has been so largely due to the improved performance of aero-engines.

Captain Baldwin-Wiseman for the last eleven years has studied closely the suitability or not of many sites for aerodromes. During the last three years of his nine years war and post-war service at the Air Ministry he reported continuously on aerodrome sites in Great Britain. During the last two years in Australia he has studied and reported upon sites which are more arid than such as can be found in England.

He feels that civil engineers must recognise their great responsibilities in the developments which are bound to ensue when every large town will consider having a landing-ground or air-park to be essential [as Blackpool, Bristol, Hull, Ipswich, Liverpool, Manchester, Nottingham and Plymouth have now.—ED.]

### LAYOUT OF AERODROME.

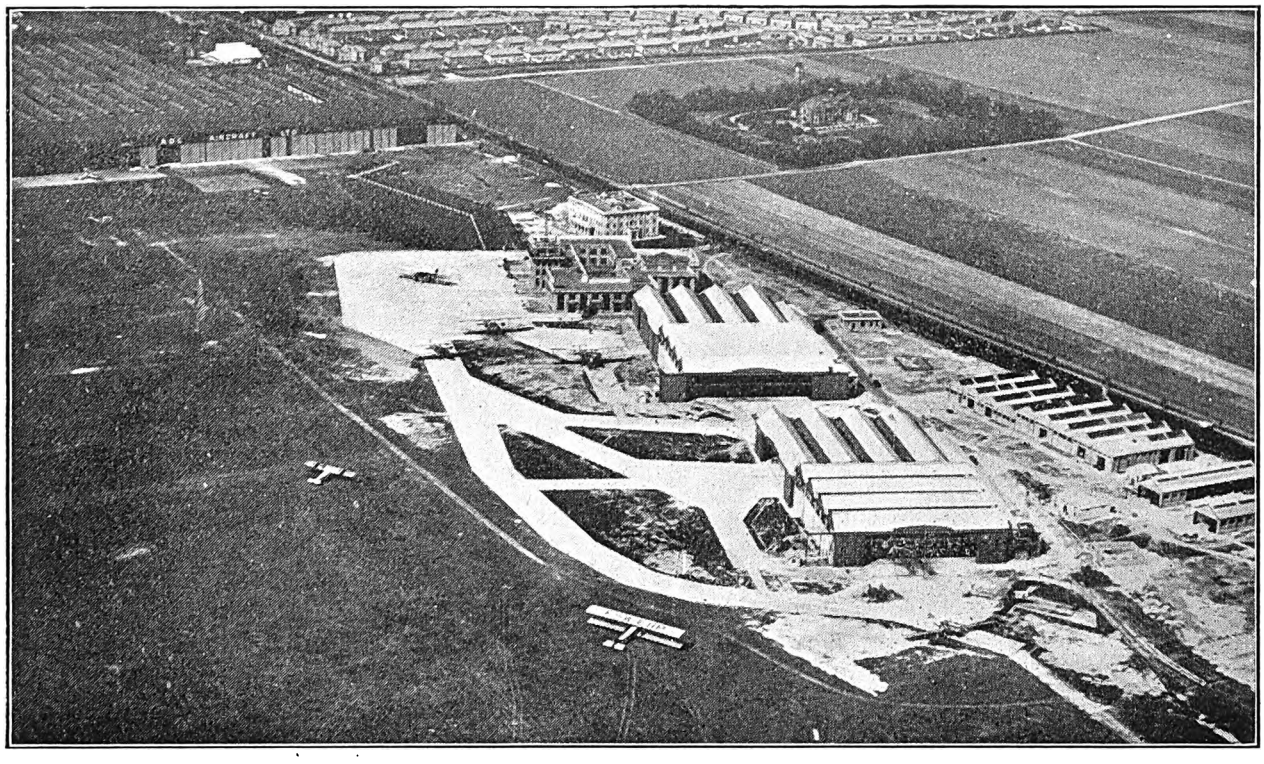
As the economic and efficient layout of an aerodrome and the artistry of the elevation and grouping of the buildings, will largely conduce to the cultivation of local airmindedness and the consequent local development of aviation, it will be necessary to plan, not only well and in some special style, suitable to the work, but also on a more generous scale than initial requirements would seem to suggest, especially in the matter of area, which cannot be subsequently enlarged, except at an abnormal cost; if a comprehensive building scheme is planned the details can be worked out in stages, as funds are made available, preferably a little in advance of traffic requirements.

It is also necessary to visualise the type of traffic which may develop at each aerodrome, and to estimate the probable limiting dimensions and capacities of the aeroplanes, for this will largely affect the provision of hangars, mechanical workshops, residential and tourist accommodation, storage of accessories, garage accommodation and other requirements.

An aerodrome may be developed as a terminal, or as a calling place in an aerial network. In the former case it will serve for the landing, take-off, storage, repair and overhaul of aeroplanes and machines maintaining the services; for the construction, assembling, testing and sale of aeroplanes and accessories; and the holding of aviation contests and meetings. In the latter case less hangar, machine shop, accessory, residential and sport accommodation will be required.

All aerodromes will develop to a greater or less extent:—

1. Regular passenger, mail and express parcel services.
2. Taxi services to other towns and tourist resorts.
3. Flips and joyrides.
4. Pilot training and testing.
5. Machine testing.
6. Accommodation for private owners.
7. Aviation contests; some Continental and American



**THE TERMINUS.—Croydon Airport. This represents the terminal aerodrome for first-class air lines, with hotel, a large building for offices and Customs, surmounted by the Control Tower, hangars and workshops.**
*—(Aerofilms photograph.)*

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aerodromes provide, or intend to provide, grandstand accommodation for several thousand people.

8. General recreation facilities, such as those now afforded at the Templehofer Feld, Berlin, and the Littorio Aerodrome, Rome. At the former the public, on payment of a small admission fee, are enabled to watch the flying by day or by night, while enjoying the conveniences of a biergarten; at the latter a ballroom, well-appointed restaurant, visitors' gallery and a large athletic field are provided. Such arrangements tend to develop in the general public the idea that an aerodrome is a place of popular resort and that aeroplane flight is but a commonplace incident of everyday existence, and also, from the passenger's standpoint, removes that feeling of isolation attendant on arrival at, or departure from, a deserted aerodrome.

The traffic will, of course, be light at first, but later on, at certain hours corresponding to the peak traffic periods of suburban railway services, the arrivals or departures may be so frequent as to necessitate special planning for the efficient and expeditious handling of the traffic.

It is interesting to recall that the modern aerodrome occupies about the same area as an ancient Roman Town such as those quoted; with the area in acres following its name. Londinium 350, Corinium (Cirencester) 240, Verulamium (S. Albans) 203, Viroconium (Wroxeter) 170, Deva (Chester) 59, and as towns have grown, so may aerodromes; although improvements in brakes and plane design may permit of the use of much more restricted sites than at present.

### Location of Aerodrome.

All efficient transport systems must rapidly dispose of their passengers and freight, an aerodrome must therefore have a good connection with good and efficient road and railway systems, especially where it is intended to develop combined aeroplane and train travel, or aeroplane tourist travel, with stop-over sight-seeing night facilities. The roads should be good motor roads, not overtaxed with too much motor traffic, leading into the neighbouring town and radiating into the surrounding countryside, the railways should have easily accessible stations, on suburban steam or electric railways, affording fairly frequent connections with main line services.

From considerations of cost of land and the desirability of non-interference with suburban building operations, in the immediate vicinity of any town, the site should be at some distance from the town, say, from three to ten miles away, but this economy should not be effected at the expense of a tedious motor ride into the town, through a dull and uninteresting or bottleneck district, with attendant traffic blocks, which will seriously re-act on the popularity of the aerodrome.

The increased cost of nearby land may be occasionally offset (by the economy of construction and maintenance afforded by a favourable location) with regard to existing electric light and power, water supply, sewerage disposal, telegraph and telephone facilities.

On the other hand, the site should be as remote as possible from established residential suburban areas, it being desirable to restrict flying, or more properly low flying, over such areas to a minimum, on account of the noise of the approaching and departing aeroplanes; also, because many of the accidents occur shortly after taking off, open country in the vicinity of an aerodrome is more favourable than residential areas to the pilot, in case he has to make a forced landing, owing to engine or other trouble soon after taking off.

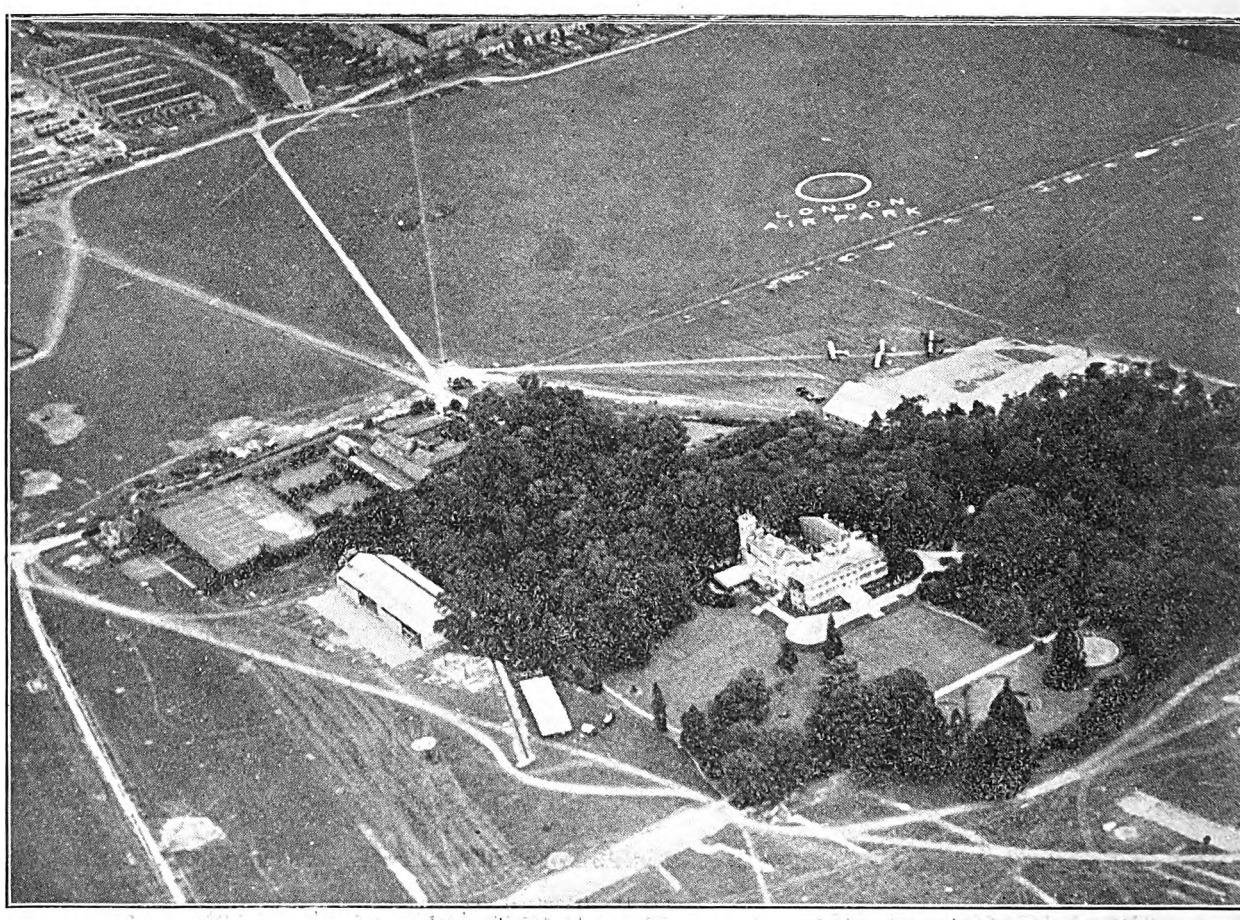
A landing-ground should be so situated that the major portion of the main lines of aerial traffic should not pass over the town served by the aerodrome, as not only is flying over congested, and probably smoke-laden, and therefore also more frequently foggy, areas undesirable, but it also adversely impresses the aerial passenger who retraces by road, the course already traversed in the air, in order to reach the town.

### Flight Aspects of Site.

The flying conditions of a site are, of course, of even greater importance than that of surface accessibility, which receives primary consideration herein, since it was more intimately connected with questions of finance that dominates most developments.

It is highly desirable to institute meteorological observations as early as possible before development work is begun to obtain comparative data on each probable or alternative site as to:—

1. The duration and intensity of the wind in each of the four cardinal directions, and if possible in each of the principal sixteen points of the compass, noting the percentage of the total time that the wind blows in each such direction and the maximum, minimum and average velocity




**THE COUNTRY CLUB.—Hanworth Air Park, which, besides a flying school and a taxi service, offers the amenities of a country club to its members.**—(*Aerofilms' photograph.*)

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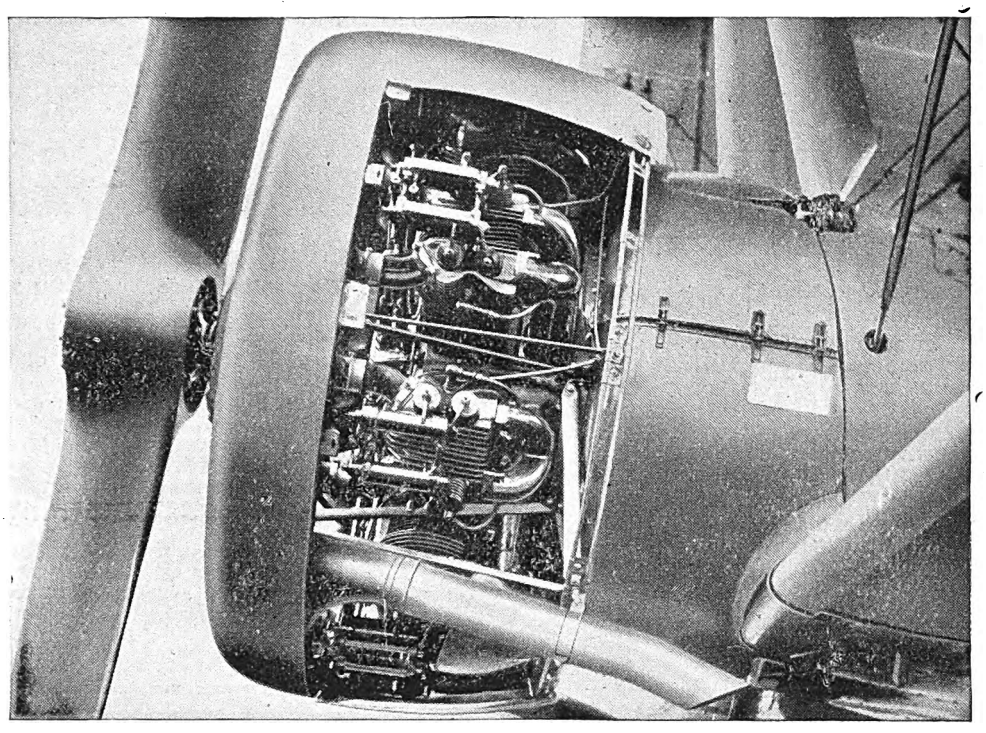
# ENGINE ACCESSIBILITY



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**AIR PARK AND AIRPORT.—A picture which shows the arrow-shaped arrangement of Heston with the Control Tower at the head. The dining-room and lounge are beneath the Tower and have windows looking out onto the aerodrome. The Customs accommodation is on the left of the middle block.**—(*Aerofilms photograph.*)

in each direction, in each hour and day, throughout the year, and especially between 4.00 and 8.00, and also between 12.00 and 16.00 hours

2. The variability of the wind in velocity and in direction, noting sudden changes in direction and the angle of the change; also maximum fluctuations in velocity.

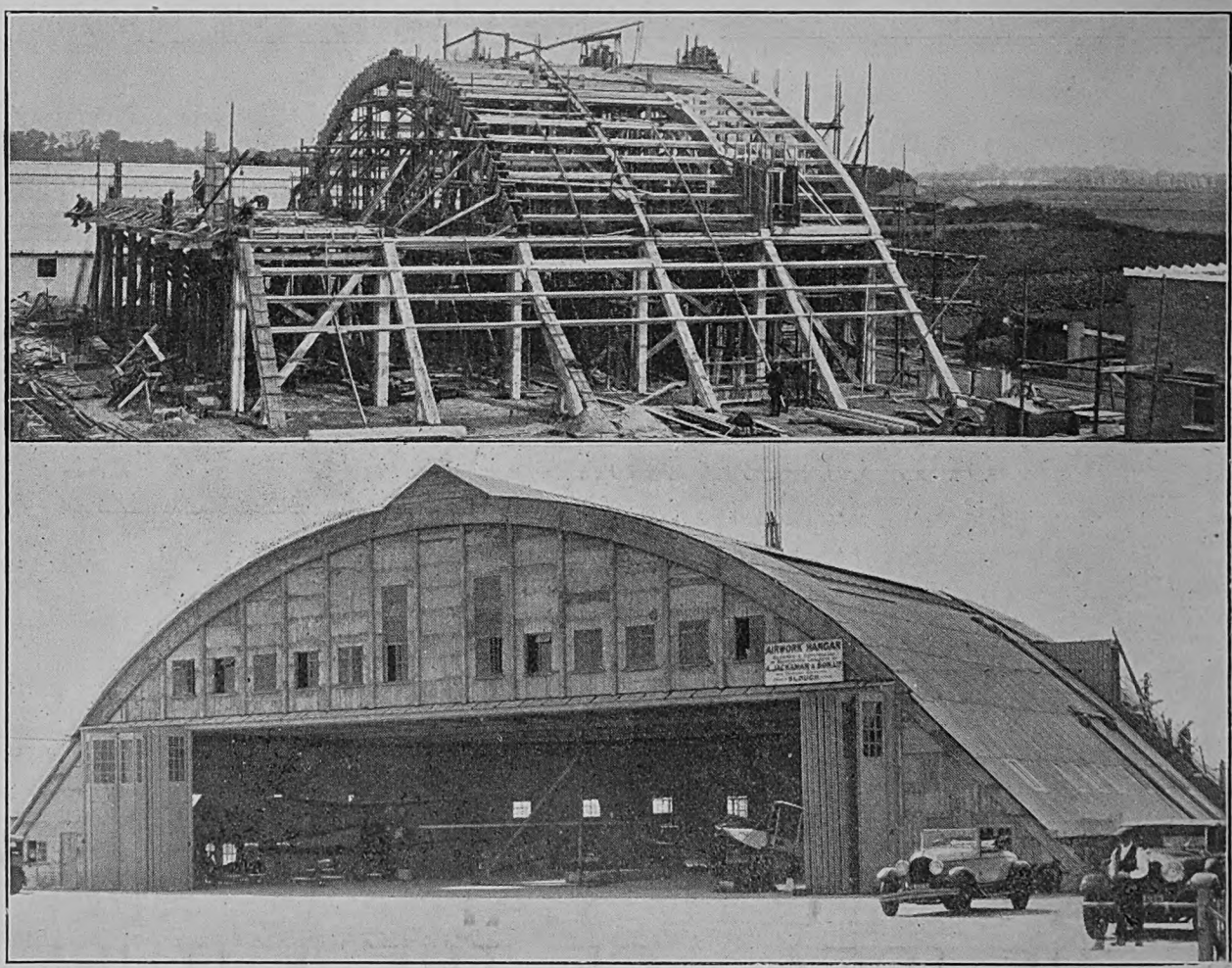
3. The variation in velocity with altitude at several levels, say at each 500 ft. from 0 to 3,000 ft.

4. The prevalence of ground fogs and mists and the intensity of fogs at various altitudes, say at each 500 ft. from 0 to 2,000 ft., also the day-light hours during which these persist after 7 a.m

5. Sunshine record.

6. Rainfall, daily record and hourly intensities.

The site should occupy high level ground, with good visibility, commanding extensive views of the surrounding country, sufficiently remote from hills, woods and other vertical obstructions causing dangerous upward air currents and eddies; it should be surrounded by fairly level, or gently undulating country, free from ravines and steep slopes, in which forced landings may be made in safety in most directions and particularly against the prevailing wind. It should be easily identifiable from the air, by means of its position with respect to well marked natural or artificial features, such as the confluence or marked windings of streams railway or road intersections, large lakes and extensive woods, especially those of unusual outline, or prominent hills, towers or other structures, by which a pilot can mentally triangulate his position with reference




**FERRO-CONCRETE.—The Jackaman Shed of Airwork Ltd. which has Esavian folding doors. Above the clear floor-space is another floor, depending from the roof, which is used for offices.**

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*The Supermarine Southampton, Mark X.*

# D.T.D.42S
# D.T.D.57A

The hull of the Supermarine Southampton Mark X, to the chine line, is of Firth Staybrite Steel (A.M. Specification, D.T.D. 42 s.).

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to the aerodrome; it should be well laid out and marked as described hereafter under the heading "Markings."

The site should enjoy comparative freedom from:—

1. Gusty or freak winds; a distant hill or belt of trees may however occasionally afford a site a certain amount of shelter.
2. Drift of factory smoke.
3. Tendencies to ground fog and mist
4. Air bumpiness, this may be due to ground moisture such as occurs when made ground covers an ill-drained swamp; the evaporation of this moisture having a cooling effect on the air above it. Incidentally a uniform cover of grass over an aerodrome prevents bumpiness resulting from the radiation and reflection of heat from bare sand patches. Over the completed aerodrome bumpiness may be minimised by using roofing material which does not get too hot under the sun's rays and does not radiate too much heat.
5. Floods and standing water.
6. Marginal obstructions, such as tall chimneys, lofty buildings, wireless masts, high tension and telegraph wires, woods, high fences, etc. Wherever such obstructions do occur near the margins of a site the effective boundaries of an aerodrome must be so set back that the obstruction does not rise above a grade of 1 in 16, ruled from the margin of the flying area, which allows a fair margin of safety on the gliding or climbing angle of most of the heavy machines; in the U.S.A. the slope is much steeper, being 1 in 7; but the slope laid down in the recent German regulations approximate to the English practice. In the case of woods immediately contiguous to a restricted area a flight gap, about 200 yards wide and sufficiently long to clear the aforementioned slope, should be cut, in order to afford safe ingress to and egress from the aerodrome.
7. Mental and casual hazards such as reflections of the sun from distant windows and glazed roofs, also the glare from headlights of motors climbing hills, approaching the aerodrome, are liable to temporarily blind or dazzle a pilot about to land on the aerodrome and so jeopardise his landing.

### Soil Texture of the Site.

The texture of the surface soil should be such that it drains easily and forms a firm, level, resilient landing surface, free from dust in prolonged dry periods and not liable to work up into a puddled condition under frequent or heavy traffic in wet weather.

Many ideally flat areas in various parts of England, mostly on the boulder clay or other clay horizons, proved unsuitable on close investigation during wet seasons, because the surface was entirely unable to withstand prolonged or heavy traffic.

### Preparation of Site.

In the case of most English sites, the requisite area extended over several fields; it was therefore necessary to fell the trees, grub the stumps of all old trees, with or without the aid of explosives, raze the hedges and the banks on which they grew, lay tile drains for the drainage of the area and to convey the ditch water to outfalls, fill in the ditches, dig out soft spots and repack with firm material, pipe and divert springs and grade the surface so that there was no surface slope in excess of 1 in 35, often working to less than that. Also to plough, harrow, soil, seed and compact the surface by rolling. In some districts the long continued practice of agriculture in damp areas, has left most pronounced ridges and furrows, which cannot be obliterated by ploughing or cross ploughing, but necessitates a considerable expenditure in slicing off the ridges and carefully compacting the slicings, upside-down, in the hollows and rolling the whole area repeatedly.

In some districts the existing drains were found to be of little or no use, having been laid in stiff clay four to six feet below the surface. The Author found on inquiry that this work was done many years ago, to secure bounties under legislation, enacted early in the last century, to encourage the draining of damp farming areas. These drains had to be treated as non-existent and the drainage of the area replanned.

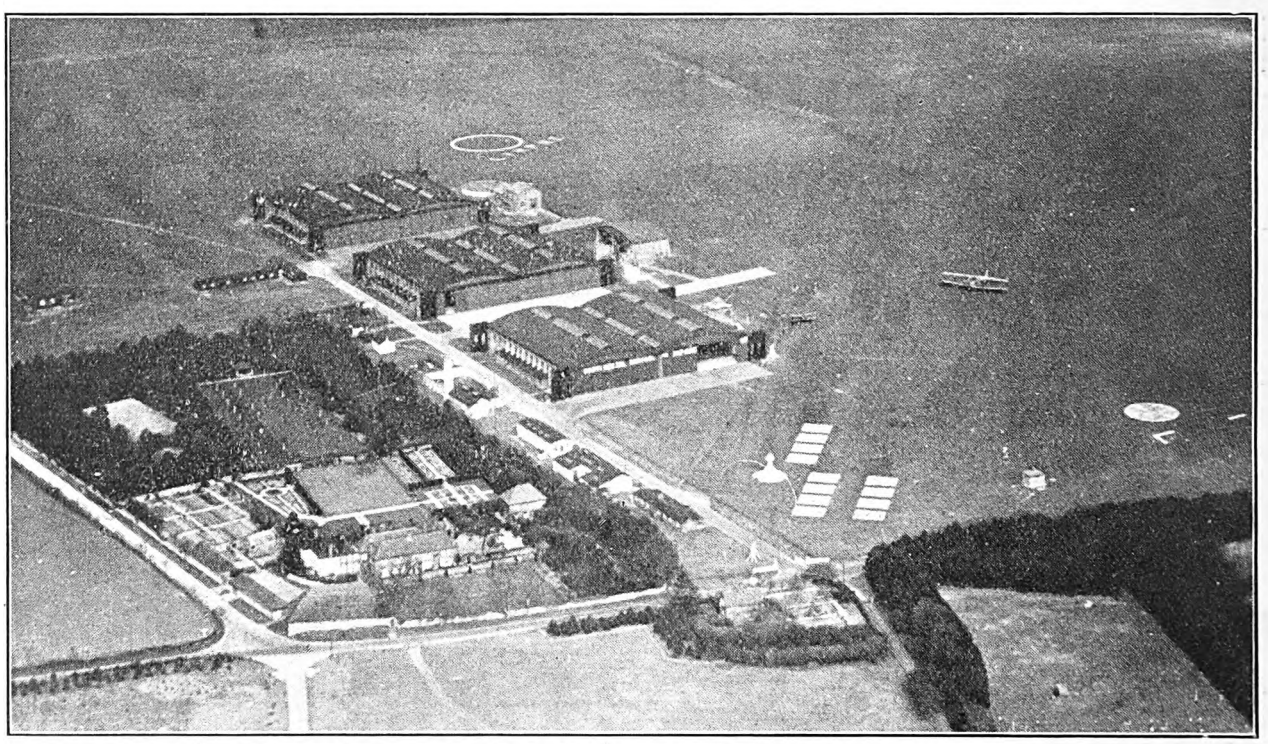
The interval between lines of drains will vary with the texture of the soil, but considering the probable maximum intensities of rainfall in Table No. 1 and the increased run-off consequent upon a considerable percentage of the area being roofed, paved, indurated, or otherwise treated, a draw-off corresponding to 0.5 ins. per acre per 24 hours, should normally suffice.

The data in Table No. 2 are abstracted from details of 20 large aerodromes laid out on extremely favourable natural sites, where the earth work was inconsiderable, but many otherwise satisfactory sites in the vicinity of some of the larger cities will involve considerable expenditures on earthwork. In such cases before excavation and filling is begun it will be desirable to strip the area, dumping the surface soil clear of the proposed grading work and spreading and

Table No. 1.

Maximum Observed Rainfall Intensities.

| Observed fall in inches. | Duration of fall in minutes. | Rates of fall in inches per hour. | minute. |
|---|---|---|---|
| 1.40 | 5 | 16.80 | 0.28 |
| 2.12 | 20 | 6.36 | 0.106 |
| 2.90 | 30 | 5.80 | 0.097 |
| 9.75 | 60 | 9.75 | 0.102 |
| 13.20 | 420 | 1.89 | 0.031 |
| 42.00 | 1,440 | 1.75 | 0.029 |



**A CUSTOMS AERODROME.—Lympne aerodrome, where private-owners and visiting aeroplanes clear Customs before or after crossing the Channel.**—*(Aerofilms photograph.)*

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# MODERN AIRCRAFT

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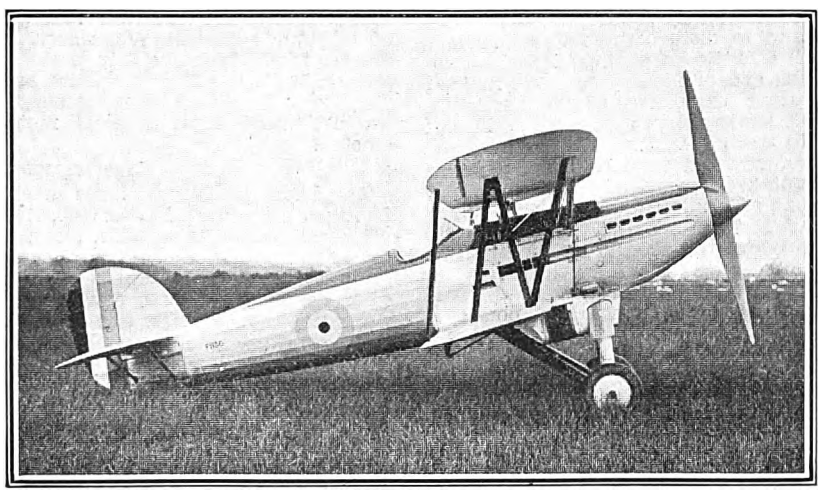

*Fairey Firefly IIM*
*Rolls-Royce F XII S Engine*

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Table No. 2.
Preliminary Work in Connection With the Preparation of Aerodromes.

| | Max. | Mean. | Min. |
|---|---|---|---|
| Area of aerodrome in acres ... ... | 428 | 273 | 173 |
| Ratio of net to gross area ... ... | 91% | 84% | 65% |
| Work per | Acre. | | |
| Number of trees felled ... ... | 25 | 2 | 0.1 |
| Number of roots grubbed ... ... | 47 | 4 | 0.3 |
| Wire etc. fence razed in yards ... | 37 | 24 | 4 |
| Interior hedges cleared in yards ... | 23 | 9 | 2 |
| Boundary hedges trimmed in yards | 23 | 16 | 2 |
| Interior ditches piped in yards ... | 38 | 12 | 1 |
| Boundary ditches cleaned in yards... | 19 | 9 | 2 |
| Interior ditches filled in cubic yards | 28 | 9 | 1 |
| Hollows filled in cubic yards ... | 60 | 15 | 1 |

rolling it, over the graded area, at the conclusion of the levelling operations.

In semi-arid areas or areas of seasonal rainfall, it is advisable to undertake the necessary grading at the beginning of the wet season and to disturb the natural surface and the native vegetation as little as possible, lightly burning over the surface at the end of the dry season, grubbing up stumps and roots, using explosives where necessary, filling and rolling hollows, sowing clover or some persistent grass growth, with one to two cwts. of super-phosphate per acre and rolling the surface from time to time.

An area which has not been prepared can be roughly tested for its suitability as a landing ground by driving a motor-car over it at about 25 to 30 m.p.h. If this is accomplished in comparative comfort, the area is sufficiently level for planes to land in safety; observations on the behaviour of a loaded 3-ton lorry, driven at about 15 m.p.h., will similarly afford information as to the bearing power of the surface.

### Dimensions of Aerodromes.

The size of an aerodrome is largely determined by the type of aircraft likely to use it, the large aerial passenger liners and heavy bombing machines of the present day and of the future require, or may require, runs of from 600 to 1,000 yards; whereas some of the very small aeroplanes can take off with runs of from 25 to 30 yards; the areas of aerodromes will therefore range from a little over a square mile to about 1/16 of a square mile.

In some aerodromes in the U.S.A. provision is made for the accommodation of aeroplanes and also airships; but unless the portion allocated to aeroplanes is rigorously marked off from that allocated to airships, the joint use of any such area is highly objectionable, since the unwieldiness of the airship, when moored to its mast, renders it unsafe for aeroplanes to manœuvre anywhere in its vicinity; it is also undesirable to locate any buildings within the circle of the airship's swing, when moored to its mast, as, in the event of an accident, these buildings may be set on fire.

### Plan of Site.

The most desirable aerodromes, given good climatic and soil conditions, are square in plan, since this shape allows a considerable length of clear run in landing or taking-off, when the wind is in any direction; occasionally circular outlines have been proposed, but the only advantage is that it affords gyratory facilities for one-way traffic round a peripheral track, connecting hangars, deplaning and enplaning points, runways and landing strips. This can be just as well achieved by planning an inscribed circular track in a square concentric with the boundaries of the aerodrome.

Aerodromes may also be rectangular, trapezoidal, "L" or "T" shaped in plan, provided there is a sufficient length of run across the narrow portion, with oblique runs of adequate length in the directions of the prevalent winds. Sufficiently wide and long flight gaps, at least 300 yards long and 100 yards wide, cut in eight directions, inclined to each other at 45 degrees; or in four directions, at 90 degrees; or in three directions at 120 degrees; providing one of the directions, in each case, is in the direction of the prevalent winds, and radiating from a central circular area, with a minimum diameter of 100 yards, have also been suggested; but these sites would be limited in possibilities of expansion and would also prove extremely costly to acquire and maintain, especially for night flying.

Triangular and elongated rectilinear areas are undesirable as sites until landing in limited areas becomes more general, by the introduction of brakes or of some helicopter, and catapults are used for taking off, as from the decks of seaplane carriers. When such is the case, long narrow dromes might be laid out in parks, or over railway stations, and on the flat roofs of special buildings, erected for such purpose and utilised on the ground and basement floors as wholesale and retail markets, motor garages, dance halls, cinemas, etc.

### Classification.

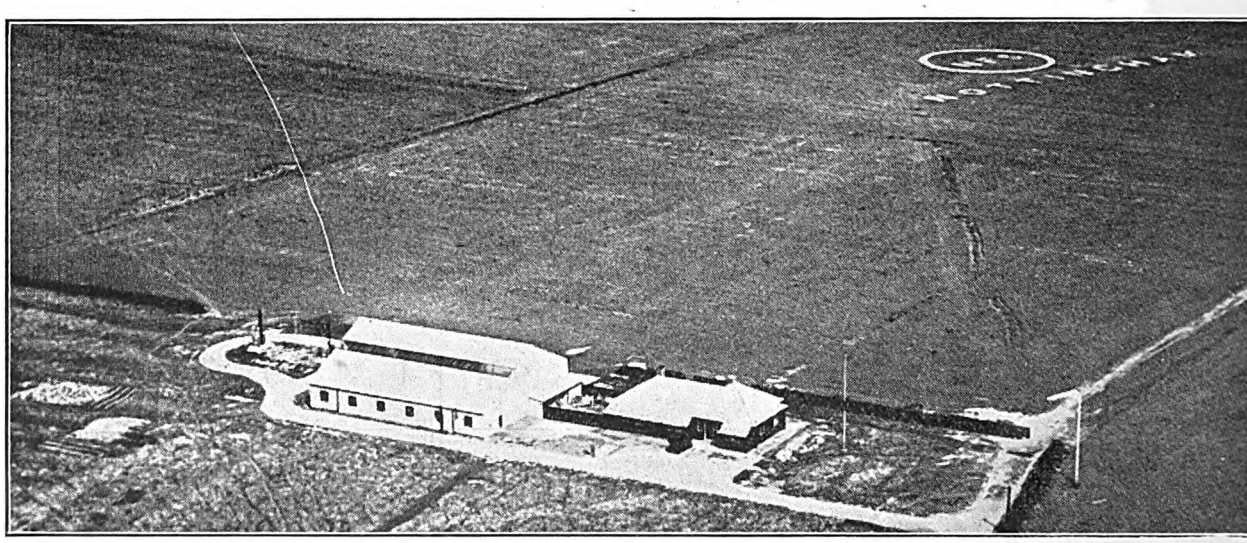
As already remarked, large machines should be afforded facilities for clear runs of 500, 700 or 1,000 yards in the principal landing directions, due to prevalent winds; which for a square with one side parallel to such principal direction gives areas of 52, 101 and 206 acres respectively and for a square with its diagonal parallel to such principal direction, the areas will be half the above amounts.

The U.S. Department of Commerce classifies aerodromes according to the facilities provided for landing and taking off, night flying and general equipment; thus, a site is in Class 1 if it affords facilities for landing in eight directions with runs 2,500 ft. long and 500 ft. wide; in Class 4 for an 8-way landing with runs only 1,320 ft. long; this class also embraces 4-way landings with runs 1,600 ft. long, intersecting in angles of not less than 60 degrees.

It is desirable from the pilot's point of view that the design of aerodromes should be as uniform as possible and that different types of planning and equipment should be grouped in classes and indicated by some numerical, or alphabetical, or numero-alphabetical, classification; which can then be indicated with the name of the station, on the ground, on the tower, in official records and time tables and on the aerial maps of the district.

### Marking of an Aerodrome.

In Great Britain only 27 aerodromes and 43 towns and railway stations are at present name-marked; since writing, the roofs of the Anglo-American Oil Co.'s tanks and depots are now having names of town and direction-arrows painted on them, so as to be legible at altitudes of 2,000 to 3,000 feet; in the U.S.A. many thousands of landing grounds and



**A MUNICIPAL AERODROME.—The N.F.S. aerodrome at Nottingham, which shows the type of shed and Club-house standardised by National Flying Services Ltd., and built by E. D. Winn and Co. Ltd.**
*—(Aerofilms photograph.)*

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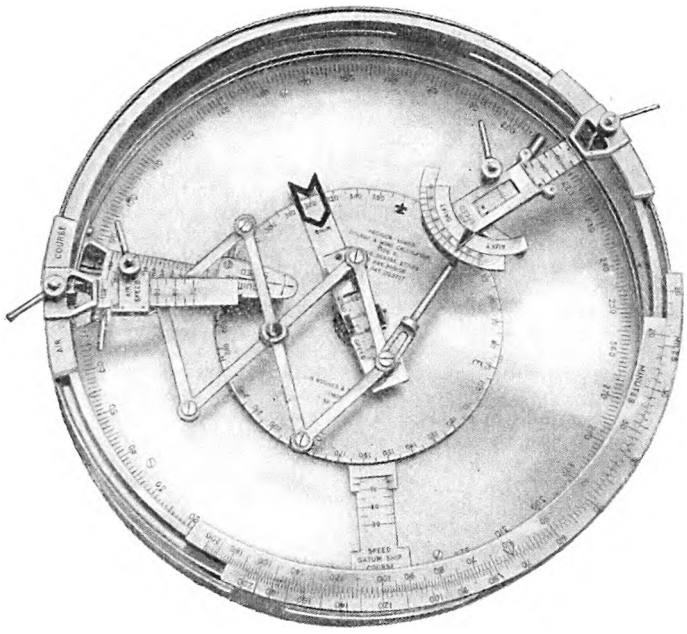

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stations are marked, some of this work having been done by industrial companies not directly connected with aviation.

The U.S. Department of Commerce has laid down a uniform specification of the size and colour of markings, and there is a standardised system for indicating various obstructions at night and also for indicating the route from beacon to beacon.

All markings should be of such dimensions and nature as to be clearly legible at an altitude of 3,000 ft. above the aerodrome.

The landing ground should be marked at its centre with a circular band of white material, such as portland cement concrete or tightly packed chalk, or limestone rubble, with an internal diameter of 100 ft. and an external diameter of at least 108 ft., trenched into the ground and flush with the surface.

A restricted aerodrome, or one which is available only for the landing of light planes, because of its limited area, should be similarly marked with a half circle on a diameter.

In the case of casual landings in backblock areas, pastoral runs, etc., the best level stretch, clear of obstructions, suitable for landing, should be marked at its centre with a square white sheet, of at least 6 ft. side, connected by strings at the four corners, to pegs driven flush with the ground; the direction of the wind should be indicated to the pilot, by a smoke fire, lighted just previous to his expected landing.

The boundaries of an aerodrome should be marked by a continuous white strip, three to four feet wide, which should be illuminated by night.

True north should be indicated by an arrow, the shaft of which should be 30 ft. long and 4 ft. wide, of white material, let into the ground and flush with the surface; pointing true north with a figure N, 9 ft. long and 12 ft. wide, just north of the north end of the arrow.

The name of the aerodrome and of the nearby town should be shown in block letters of similar shape, dimensions and material, to that of the markings already described.

### RUNWAYS.

In the early days of aviation a good well-established turf was adequate both for landing and taking-off; it was resilient, offered a fair cushioning resistance, absence of glare and freedom from air bumpiness, resulting from heat radiation and reflection. These qualities rendered it highly desirable, but with increase in the number and weight of machines and in speed of approach in landing and speed in taking-off, the damage to the turf by the tyres of the undercarriage, tailskids and tramping feet, especially in prolonged wet weather, rendered some other form of surface necessary.

In some American aerodromes of recent construction, these prepared surfaces occupy from ½ to ¾ of the total area of the site.

Aeroplanes should rise head to wind, although some can rise satisfactorily 45 degrees away from the wind. Runways should therefore be provided in the direction of the prevalent wind and also at right angles to it, where only a 4-way course is provided. If however funds permit an 8-way course is desirable, one of the ways being in the direction of the prevalent wind and all being of sufficient length for the take-off of the heaviest aeroplanes likely to use the aerodrome. In a few cases the lengths of runways have been proportioned to the respective axial lengths of the wind rose, but this practice is not to be commended, except the rose be constructed from data collected continuously over a very lengthy period.

How the wind may vary in the eight principal directions is shown hereunder for three aerodromes, the amount in each direction being expressed in percentages of the total.

| No. | N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | All directions. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 19 | 9 | 10 | 11 | 20 | 12 | 14 | 100 |
| 2 | 14 | 7 | 9 | 11 | 20 | 16 | 8 | 15 | 100 |
| 3 | 16 | 12 | 4 | 11 | 31 | 8 | 8 | 10 | 100 |

Very small well-engined aeroplanes will rise in about 30 yards, others in less than 100 yards, but very heavily-loaded machines may require a run of from 500 to 1,000 yards. The length of run will also vary with the condition of the surface and the elevation of the site above sea level; the latter aspect need not be considered here, as it would not affect the design of any English aerodrome, but on a smooth and unyielding surface an aeroplane more quickly attains flying speed and consequently a less length of run is required than in the case of a more yielding or rougher surface, where some of the driving effort is expended in overcoming ground tractive resistance.

The runway surface should be continuous at the intersections of the runways and should also connect with the enplaning and deplaning points and the apron surrounding the entrances of the hangars; so that from leaving the hangar until taking off, including refuelling, the aeroplane travels over a good uniform surface. The minimum width for a runway should be 25 yards, but runways up to 100 yards in width are desirable, as two of the largest planes can then pass or take-off from it together.

The surface should be of Portland cement concrete composed of: 1 part of Portland cement, 2 parts of sand, 3 parts of gravel, mixed with 4.25 gallons of water per sack of cement; with a mesh reinforcement, laid on an underbed of compact rolled rubble, or broken stone. Allowance should be made for a temperature expansion of the concrete of about 1 in. per 100 ft. The whole structure should be of sufficient thickness to form a strong, unyielding bed under the heaviest aeroplanes.

At present this represents a load of about 15 tons on a wheel base of 7 ft. 3 ins., or where the undercarriage is in two parts, each part being immediately under an engine, the distance between the outer wheels is about 23 ft. and the distance between the inner wheels about half this; but with advances in aviation these loads may increase to 30 or 50 tons and the wheel base will not be greatly increased.

Though each case should be considered on its merits, existing conditions would call for a surface of Portland cement concrete 4 in. to 6 in. thick, resting on 9 in. to 12 in. of compact rubble, the thickness of the concrete at the crown increasing to 1.5 times that at the haunches. In some soils it might be necessary to edge the surface with concrete shoulders of substantial width, built with the cross section of a retaining wall.

Runways of other material have been proposed and constructed, but although cheaper in construction are not so desirable from a service aspect.

### LANDING STRIPS.

Although runways are used for landing, the requisites of landing strips differ somewhat from those of runways; for the former must be sufficiently yielding to develop drag resistance and to damp out bumps in bumpy landings, yet must be sufficiently firm to sustain the impact of heavy aeroplanes landing at fairly high velocities under all conditions of the weather; some small machines land at the low speed of 22 to 25 m.p.h., or a little under one-third of their maximum flying speed, but many larger and high-powered machines land at speeds of 45, 50 or even more m.p.h.

The smaller machines weigh when loaded from 0.4 to 1.5 tons. A 12/14-passenger, twin-engined machine weighs from five to six tons; a 20/30-passenger multiple-engined machine weighs from 10 to 15 tons when loaded, and in all probability loaded weights of from 40 to 50 tons will be a common experience in the near future. This, coupled with the speed of approach, calls for the provision of a surface able to withstand loads of at least twice the static amount stated above. A good close-grown, close-mown grass surface makes an ideal landing surface where the traffic is not heavy, but for the heavy traffic it is unsuitable, because in prolonged wet weather it cuts up into deep muddy ruts, and in prolonged dry periods the dust from the eroded surfaces, churned up by the backwash of the airscrew, is harmful to the engines and an annoyance to the passengers.

It is therefore necessary to provide a soft resilient dust-free and mudless surface, proofed against the action of rain, sunshine and drying winds. Such a surface may be prepared as follows, scarify the surface, if it is a fine soil, spread a 4 in. layer of coarse material over it, drag the disc plough to a depth of 6 in. to ensure an uniform consistency. Then pressure spray the surface with road oil having an asphalt content of 60 per cent. to 70 per cent., at the rate of 0.5 to 0.75 gallon of road oil per square yard of surface, on three to six separate occasions; the ground being disc ploughed before and graded and rolled after each application; this gives a good waterproof layer of resilient material, 6 in. thick. Other cheaper, but less efficient, methods of waterproofing the surface have also been tried, but it is not necessary to detail them here.

Landing strips which should not be less than 100 yards wide and may be of much greater width, are laid out, often parallel with the runways, with the same consideration for wind-direction as the runways, since aeroplanes always rise or land into the wind whatever its direction, although some types of undercarriage permit of cross-wind landings being made. Provision should be made for the more general type of machine; the strips should be so laid out that a machine can taxi over a continuous surface, from the landing to the deplaning point and thence to the hangars. In the case discussed runways and landings strips have been considered as radiating from the centre of the aerodrome, but in some cases these tracts may radiate from a point near the control

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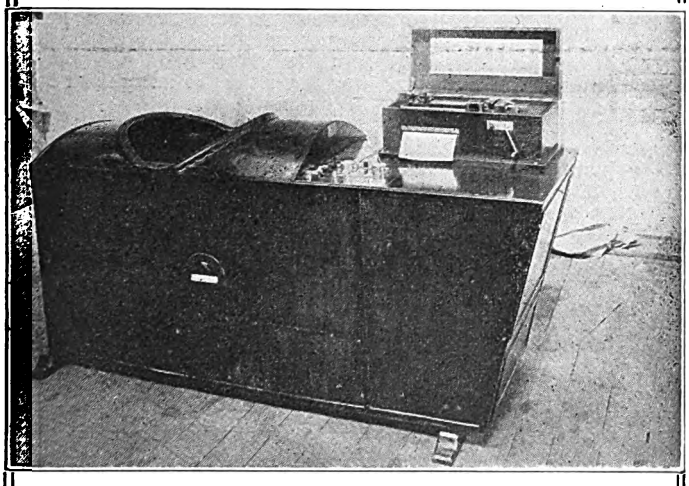

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tower; the centre of the hangar line; an end of the hangar line, or a corner of the aerodrome.

The angle between successive tracks should be not less than 60 degs.; these arrangements do not, however, lend themselves so well to the development of the gyratory one-way traffic, which may be essential when the aerodrome is exceptionally busy. In a few cases these tracks are isolated, with turning areas, 400 ft. to 500 ft. in diameter at each end, but there does not appear to be any special advantage in this arrangement.

### Buildings.

The buildings on an aerodrome should be pleasantly situated in well-laid-out lawns, with shrubberies and bright flower gardens. They should be of fireproof construction and sufficiently segregated to reduce fire hazards, but sufficiently low and closely arranged to minimise flying hazards, so leaving a considerable portion of the aerodrome free from any fringe of buildings. The walls should be of stone, brick, Portland cement concrete, wire mesh and plaster, or sheet metal, coloured, painted or plastered a light cream or fawn colour, with a dull finish so as to obviate glare. The roof should be of such material as not to cause glare at any angle, or bumpiness, by radiation or reflection on bright sunny days.

The location of the buildings should, in general, be on the leeward side of the aerodrome, affording easy access from the principal roads of the district and from the neighbouring railway station. The buildings should comprise as many of those detailed hereafter as the service may demand or funds permit.

1. The control tower should occupy a central position, somewhat in advance of the general building line, so that the controller may have a clear and unobstructed view of all aircraft entering or leaving the aerodrome, or the hangars. It may be connected to or form an advanced part of the administrative block; it should rise to a considerable height above the roofs of most of the buildings on the aerodrome; it should be square in plan, with an illuminated clock face in each side and above this, in large letters, also on each side, the name of the station and its identification numeral or letter, which markings should be illuminated by screened flood lighting at night. Rising above the roof of the tower a 20 ft. mast should be erected, carrying the wind direction indicator, also lighted at night.

2. The administrative block affording accommodation for aerial passengers and the administrative staff should contain:—

(*a*) Reception hall with booking office, cloakroom, express parcels office, post, telephone and telegraph office, waiting and reading rooms, bookstall, hairdressing saloon and tobacco kiosk. Bulletin boards would be fixed round this hall exhibiting notices, giving details of daily weather observations and forecasts, details of aerial, motor-car and train services, an aerial map of the immediate district and of remote points served by plane and rail.

(*b*) Customs and immigration office.

(*c*) Administrative offices.

(*d*) Meteorological bureau.

(*e*) Photographic room.

(*f*) Wireless mast and aerials at rear.

The roof of this block, if flat, might be laid out as a roof garden and be open to visitors desiring to view the aerodrome from an elevation.

The deplaning and enplaning points should be connected by a covered way with the nearby administrative block so that passengers are not exposed to the weather on alighting at or departing from the aerodrome, the aeroplane taxying from the actual point of landing or take-off to these points before discharging or after embarking passengers.

3. Hotel and restaurant near to the administrative block and the road, but set back from the aerodrome and remote from the hangars, preferably enclosed with low hedges and private grounds. These premises might also be equipped with ballroom, tennis and squash racquets courts, swimming bath, etc., to serve as the headquarters of a country flying club.

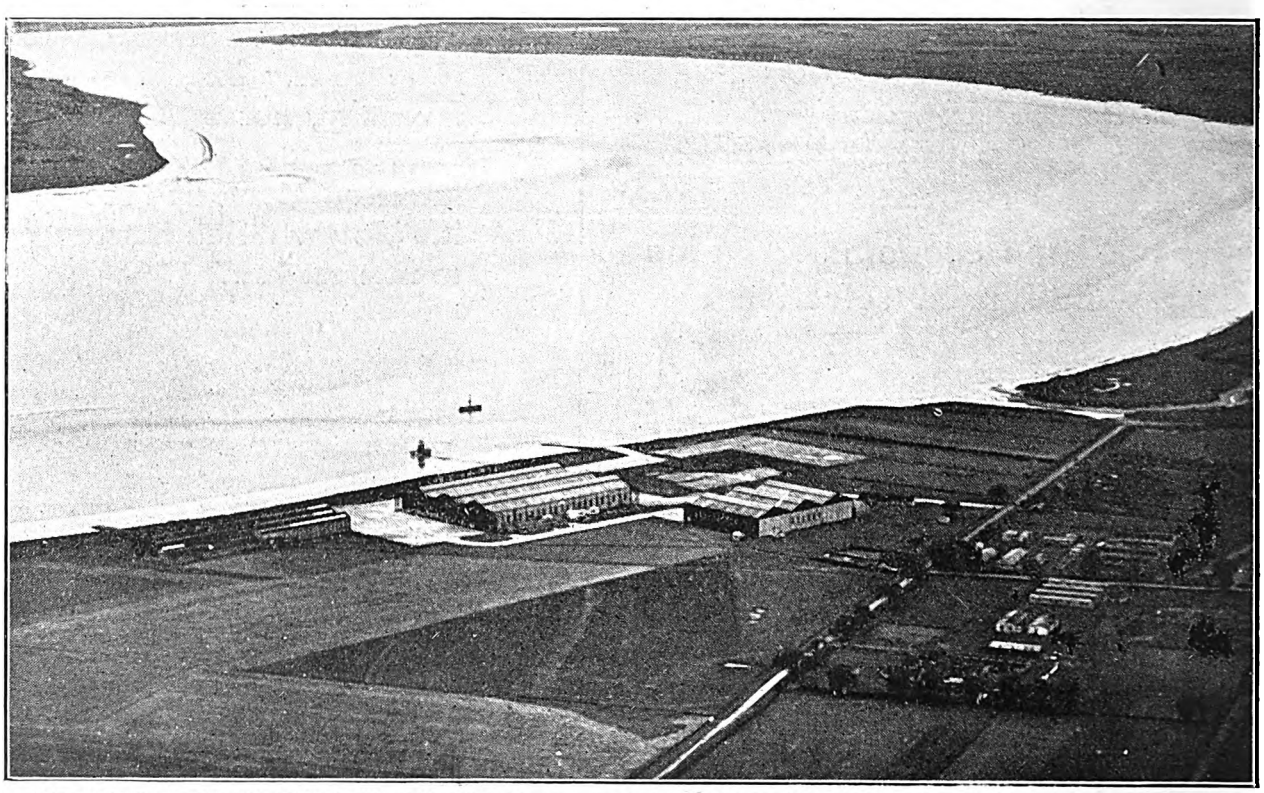
4. Garage and parking space for motor 'buses and private motor cars near to the road system and on the side of the hotel remote from the administrative block.

5. Rest rooms and residential block for pilots, mechanics, ground and office staff, on the side of the administrative block remote from the hotel.

6. Service hangars, repair workshops, testhouse and stores for accessories and spares, on the same side of the administrative block as the staff residential block, but more remote. The assembly and repair workshops and the testhouse should be conveniently situated with regard to the hangars. The dope shop should be so isolated that there is no risk of fire.

7. Hangar accommodation and workshops for privately owned and flying club machines should be situated on the side of the service hangars, remote from the administrative block. These hangars should be entirely separate from those used for air-line machines; in some cases a large hangar is divided off by fireproof partitions into cells, each cell being provided with separate doors, light and power points and meters; in this way fire risks are minimised and each owner enjoys private accommodation.

8. Power house, generating current for lighting the grounds and the buildings and heating the buildings, also for pumping water from a well to an elevated tank of adequate capacity for domestic and trade supply, flushing drains, sprinkling lawns and fire protection; also for pumping sewage or drainage from sumps into outfalls.



**AN AMPHIBIAN AERODROME.—The Blackburn aerodrome and works at Brough, which is also a base for flying-boats and seaplanes and a school for refresher courses for the Reserve of Air Force Officers.**—(*Aerofilms.*)

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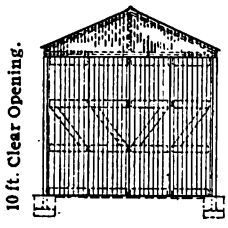
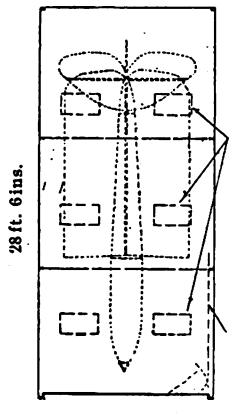
# HANGARS FOR SMALL AEROPLANES

## (HOUSED WITH WINGS FOLDED)




ELEVATION:—
Door End.

12 ft. 6 ins.




PLAN.

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### SPECIFICATION.

Building of steel framing clad with 24G. galvanized corrugated sheets.

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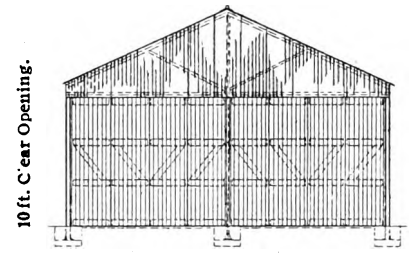
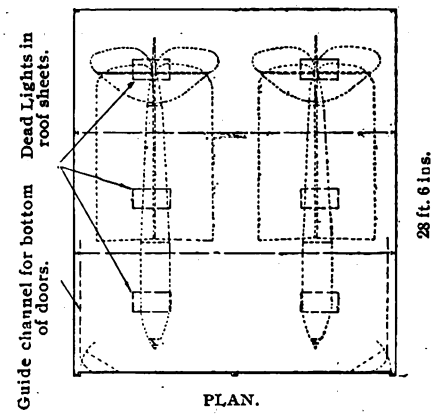
Lighting:—No. 6 roof sheets with special openings, 36 ins. by 20 ins., for receiving glass, also with glass cut to suit, and sufficient putty for fixing.

Fabricated steelwork, painted one coat oxide paint at works, and marked for erection.




ELEVATION;—Door End.

25ft.

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9. Bulk storage oil fuel and piping system to refuelling points on the aerodrome.

10. Water supply and fire protection tank in any convenient position in the building area.

The planning follows a linear arrangement or a grouped or bunched arrangement, but care must be taken in either planning to comply with the desiderata already mentioned or subsequently detailed.

### HANGARS.

Hangars are in general rectangular, but at Los Angeles an hexagonal hangar has recently been constructed with a central repair shop and an overhead service of fuel and oil.

Hangars may be arranged at right angles to the direction of the prevalent wind or side on to the aerodrome, with the long side parallel to the direction of the prevalent wind. In the former case it may be difficult to open or close the doors in periods of high wind and during prolonged dry spells, dust from the aerodrome may be blown into the hangars, damaging the engines; the former arrangement prevents low flying over the area; the latter arrangement allows the machine to come out of the hangar, taxi along the runway and take-off at one end of the line, landing towards the other end of the line.

The length, width and height of a hangar will be determined by the present or prospective dimensions of the machine and the numbers of each size it is intended to accommodate. The largest aeroplanes at the present time have a wing span of 145 ft., an overall length of 85 ft. and a height of 33 ft. The smaller aeroplanes have a wing span of 43 ft., an overall length of 23 ft. and a height of 6 ft. 9 in.; some have folding wings, and when thus dismantled occupy a space of 23 ft. by 4 ft. 8 in. [The space occupied by the usual light biplane with folding wings is 24 ft. long x 10 ft. wide x 9 ft. high.—ED.]

A common size of hangar is 125 ft. by 75 ft. by 50 ft. Some hangars are constructed of channel steel columns, spaced 20 feet apart, centre to centre, forming from four to 15 bays, with corrugated iron sheeting, or lath and plaster, or wire mesh and cement, for walls, and arc welded steel construction roofs with corrugated iron sheeting in spans ranging from 60 ft. to 150 ft. The fabrication of the arch roof can be completed on the ground, raised into position and held in place by the welding of the channel purlins to the arch. Steel sashes on each side and in the end walls are also welded in position.

In some cases the hangar is formed with arched steel frames, covered with galvanised iron and the lower portions of the arch ring on each side, cut off by the walls, forming the sides of the hangar, are used as workshops. The doors and openings placed in the side or end walls are 80 ft. to 150 ft. wide, 18 ft. to 50 ft. high, arranged in folding or sliding units 6 ft. to 20 ft. wide, each panel of the heavier widths is carried on double-flanged wheels 9 in. to a foot in diameter, with roller bearings, operating on 15 lb. to 20 lb. rails; the top being held by two guide rollers about 6 in. in diameter. Some have doors at both ends, others have doors opening onto the aerodrome, the rear section being walled off to form a fireproof enclosure for a dope shop about 60 ft. by 20 ft., with an opening about 18 ft. by 20 ft., closed by a steel roller fireproof shutter; the remainder of the space being utilised for office, store and lavatory accommodation.

The floor is composed of about 4 in. of 1 : 2½ : 3½ Portland cement concrete with a pitch towards the door, or with a slight slope from both sides to a central drain, about 10 in. by 8 in., discharging into a storm water drain. Along the whole front of the hangar and along the two ends, if there are end doors, an apron of Portland cement concrete at least 100 ft. wide, with a slight slope away from the hangars, should be laid, connecting with the runways; this surface, like that of the runways, should have expansion joints at intervals of 90 ft. with intermediate contraction joints at intervals of 30 ft. A two-storey hangar, with a ramp approach to the upper floor rising 1 in 10, is in use at the Littorio Aerodrome, Rome.

### LIGHTING.

The lighting equipment of an airway system comprises the following lights:—

ROUTE LIGHTS, rotating electric-lighted beacons on steel standards or towers, 50 ft. to 90 ft. high. In July, 1928, there were 5,880 miles of lighted airways in regular operation in the U.S.A., which has since increased to 10,500 miles. The beacon lights are usually of 2,000,000 c.p., but more powerful lights, up to 8,000,000 c.p. are in use; some are fitted with an automatic lamp changer, which replaces a burnt-out bulb with a new one. Each beacon is equipped with an illuminated arrow pointing in the direction of the next beacon.

The Australian (Kalgoorlie to Adelaide) route is equipped with electric-lighted rotating beacons of 1,075,000 c.p. with a visible range of 66 miles, although it is reported that on one occasion a beacon was observed by a pilot at a distance of 115 miles.

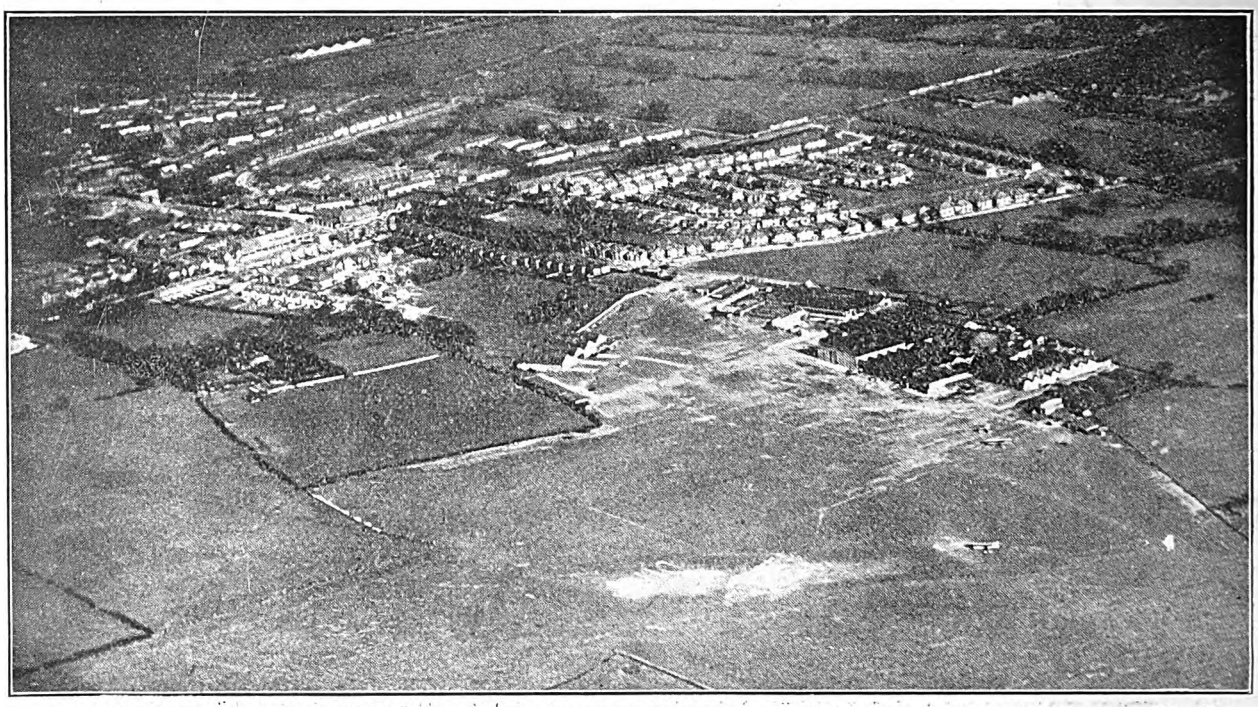
With the growth of aviation, theatres and city shops may, as an advertisement, instal powerful lights on the roofs of their buildings to assist pilots in locating aerodromes, but as it is very difficult to distinguish between fixed lights of any character, the Civil Aviation department should exercise a veto so that this phase of activity does not give rise to confusion and should make it a condition of authorisation and registration that the light be properly shielded, rotating and intermittent, and that an undertaking be given that it be permanently maintained.

APPROACH LIGHTS, rotating incandescent lights are most suitable, but owing to dazzle are usually located from one to two miles from the aerodrome.

OBSTRUCTION LIGHTS, red electric lights are mounted on the tops of masts and similar obstructions. Sometimes the obstruction is outlined in lights.

BOUNDARY LIGHTS are spaced at intervals of 100 yards round the area. Neon lights are generally used on account of their wide lighting range, the absence of dazzle, owing to their comparative low light density, and their reddish tinge which readily distinguishes them from other lights.

FLOODLIGHTING is used to illuminate all aerodrome buildings, the wind cone, and to define the extent of the landing-ground. For this latter purpose two or more high-powered



**A COMMERCIAL AERODROME.—The De Havilland works, offices and aerodrome at Stag Lane, with the sheds of the London Aeroplane Club on the left.**—*(Aerofilms photograph.)*

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lamps are mounted with a 24-in. mirror behind a lens, giving a beam spread of fixed angle, all rays making a greater angle with the horizontal than five degrees being eliminated by a stray light cut-off, so protecting the pilot's eyes of an incoming plane from glare.

Individual runways may be lighted when the wind is in the direction for using such runways, but if the wind should change while a pilot is landing those lights must remain on until he has landed, although those on a more suitable runway may be switched on.

FUELLING.

Fuelling was originally performed from a service truck, but the fuel is now pumped through underground pipes, to metered supply points in steel boxes, sunk into the aerodrome, in convenient positions, so that the cover of the box is flush with the surface; each box is fitted with 75 ft. of petrol hose, also air and water hose, and for night service an electric torch on a flex. At the Littorio aerodrome storage is provided for 200,000 litres of motor spirit.

WIRELESS.

The landing of aircraft in fog will doubtless always be attended by considerable risks, but in this as in direction finding *en route,* when sky and landmarks are obscured by mist, the pilot will derive considerable assistance from wireless. The radio telephone affords considerable assistance in notifying the pilot of weather conditions ahead and other necessary data.

Along air routes in the U.S.A. directive radio beacons are installed at or near landing grounds, at about 200 miles intervals, with "marker" beacons at intervals of about 25 miles. In the former type two loop antennæ at right angles to one another emit a series of waves of the same radio frequency, but with tones of different cycles, impressed upon them. An aeroplane moving along a line equidistant from the axes of both beams receives signals of equal intensity, the Morse code T — —, when it drifts to the right or left of this axial line, the signals received become N —·, or A ·—.

The "marker" beacon, a sort of channel buoy of the air, supplements the directive beacon by emitting a distinctive and continuous call sign.

In the rotating directive beacon, directing antennæ rotate at a low speed, about 1 r.p.m., a special signal being emitted when the lemniscate rotating in space passes through North and East. The pilot notes the time interval in seconds, with a stop watch between the receipt of these signals and multiplying this time interval by a constant, obtains his bearing in degrees from true North.

DIRECTION-FINDING STATIONS.—On an aeroplane which carries a receiving and transmitting set, requesting its position, two or more direction-finding stations jointly determine the position by observation of the radio waves from the plane, the information being then transmitted to the plane.

FIELD LOCALIZER.—The position of an aerodrome can be indicated by a field localizer, which consists of two buried oval loops, the larger one, which measures about five by two miles, has a straight side passing through the aerodrome. Near to this side and surrounding the landing-ground is the smaller loop. A machine circling over the larger loop receives a signal, once per revolution, from the smaller loop when immediately over it, thus picking up its position.

CONCLUSION.

In the United States not only has the Government stimulated private enterprise to a considerable extent, but private benefactors, like Mr. Daniel Guggenheim, have given large sums for the endowment of the teaching of aeronautical science in universities and technical institutions where courses can now be taken in aeronautical engineering, aerial surveying, etc.

In Germany the Reichstag and State governments, as well as some municipalities, have greatly aided the development of aviation by voting large subsidies to the various aviation companies.

In the early days of aviation great papers like *The Daily Mail,* contributed greatly to the development of flying, and the great interest of Lord Wakefield and other aviation enthusiasts in lengthy flights has materially advanced aviation not only in Great Britain, but in the World, to the position it now occupies.

But great as are the improvements in the art of flying, the construction of aeroplanes, engine efficiency and quality in fuel and lubricating oils, these advances cannot be fully demonstrated if the ground side of the problem does not receive similar close and detailed attention, especially during the next decade, for, as already remarked, it is necessary to foster the cultivation of general airmindedness.

Some wealthy patrons of aviation might therefore materially aid in the advancement of the art by founding a travelling fellowship, to be awarded annually or triennially, alternately to an experienced engineer or architect, conversant with aerodrome construction, to enable the Fellow to travel in the United States, Germany, France and other countries, noting and reporting in a monograph on the development of aerodrome construction and equipment in those countries.

THE DISCUSSION.

MR. C. H. CLAYTON, the Chairman, opening the discussion, said that the paper would appear to give an adequate specification for an aerodrome, and that without any travelling scholarship. He recounted an experience of his own in 1916. At Huntingdon there is a very large field of some 250 acres which is alleged to be the largest meadow in England. When Mr. Clayton was there during the Summer of 1916 he saw a surveyor at work and found on inquiry that he was taking levels as a preliminary to making the meadow an aerodrome.

Mr. Clayton warned him that the meadow would be under water in the Winter, but the surveyor said that was none of his business. When Mr. Clayton again passed, and it was during Winter, he had the melancholy satisfaction of seeing the unfinished hangars rising above a lake of water.

MR. C. P. HUNTER, whose Hunterised aerodromes are now an essential part of the ground organisation of aviation, said that as a maker of aerodromes the paper was the best he had ever heard or read. He queried the width of a folded machine as given by the author and suggested that 10 ft. 6 in. was nearer the mark than 4 ft. 8 in.

He said that to strip off the top surface of a site as suggested by the author was not economic and on a 300-acre aerodrome like the one which his (Mr. Hunter's) firm are now making at Portsmouth would not be economic as it would entail the moving of 242,000 tons of soil. With references to the author's remarks about the 100-ft. circle he mentioned that the one at Henlow was 156 yds. in diameter but was too narrow. He suggested that the width should be 5 per cent. of the diameter and suggested that 200 ft. diameter was the proper size. It should be made of concrete and not chalk which machines were liable to drag up and strew about the surface making a mess. He suggested that the North arrow, as specified by the author, might be mistaken for the Landing Tee.

MR. NIGEL NORMAN, who is well-known as one of the directors of Airwork Ltd., whose Air Park at Heston is probably the first paying private venture of its kind, disagreed from the author about the placing of buildings and said that at Heston they had put the social amenities and services right up in front. This was important both to on-lookers and travellers as the first could witness all the activities of the Air Park in comfort and the second could obtain their requirements after travel, such as refreshment and the like, with less trouble.

The author had taken his example from countries such as the United States and Germany where money was not important. Economy must be considered in the lay-out. With regard to the author's suggestion that aerodromes should be away from residential districts he suggested that an aerodrome increased the value of a property by bringing more business of various kinds. When they started at Heston they were right out in the open and now houses are being built all around them. Mr. Norman suggested that this will happen with increasing frequency as Air Parks become the terminals for long-distance traffic.

COL. HAWKINS said that he knew nothing of aerodromes but he would compare the three forms of transport, that is, sea, rail and air. He thought that docks and stations were not so elaborately fitted as the aerodrome to the author's specification and said that he thought the cost would be terrific and the interest on capital would be pretty large. Could it pay? He thought that the author had outlined an ideal as opposed to an economic design.

## HOLDING THE GROUND.

If airports are not as numerous as they might be in the British Isles there are at least some counties, cities and town-planning areas which have reserved suitable land. Since June, 1927, Sir Alan Cobham has been in touch, as a consulting engineer, with all the principal cities and towns in the country, and since the Autumn of 1929 more than fifty surveys have been made for towns, private individuals, and companies. Doncaster and Liverpool have had full layout schemes, with plans, prepared; surveys have been made for 45 others, and 149 have become sufficiently interested to negotiate.

The method of choosing the site is to survey in detail all the country within a radius of seven miles, if a small town, or twelves miles if it is a large one. The report submitted deals with considerations which should govern the choice of a site and then discusses in detail the possible locations in the neighbourhood. Two maps, of one-inch and six-inch respectively, are prepared in a way which shows all pertinent features clearly, with the land recommended for an aerodrome and that which should be acquired near by to prevent interference with its usefulness by high buildings.

In spite of repeated warnings, many towns have not yet realised the danger to their own interests caused by the networks of high-tension overhead cables which are now growing all over the country. Good aerodrome land is also good country for transmission lines, and the Electricity Commissioners cannot avoid taking their lines over what may be the best aerodrome site in the neighbourhood unless they know it as such.

Even if the preparation of an aerodrome is not contemplated in the immediate future, the local government in any district will save itself untold trouble and expense if they proceed at once to reserve an aerodome site under expert advice. With the position once picked, the erection of buildings or transmission lines in dangerous proximity can be prevented from the beginning, a much cheaper and easier proceeding than trying to select a landing-ground after the whole district has been built up.

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# COMMERCIAL AERONAUTICS.

## NATIONAL FLYING SERVICES LTD. IN 1931.

One of the most interesting developments to watch during 1931 will certainly be the progress of National Flying Services Ltd. Almost everybody connected with aviation knows by now that the firm, which is commonly known as N.F.S., has had a very difficult time this year, with the result that the balance sheet was distinctly unfavourable. As a result wholesale reforms are being made, and the new Board of Directors deserves every encouragement in its efforts.

The new Directors are as follows: Mr. J. G. Peel, J.P.; Mr. C. R. Anson; Mr. W. S. Stephenson, M.C., D.F.C.; Colonel the Master of Sempill, A.F.C., F.R.Ae.S.; and Sir Alan J. Cobham, K.B.E., A.F.C.

Of these Mr. J. G. Peel is the Chairman. Mr. Anson (the Vice-Chairman) and Mr. Stephenson are particularly concerned with Administration and Finance, Colonel the Master of Sempill will take charge of the Technical Direction, and Sir Alan Cobham will look after Development and Publicity.

This division of labour seems eminently sensible. Mr. Peel is a prominent personage in the banking profession, and in the Lancashire Cotton Trade. Mr. Anson is a director of E. D. Winn and Co. Ltd., the big building Contractors. Mr. Stephenson, who is a Director of Electric and General Industrial Trusts Ltd., The Aero Syndicate Ltd., The Monospar Co. Ltd., etc., had a distinguished career as a war pilot in the R.F.C. and R.A.F., and so knows what pilots want.

Colonel Sempill is recognised as one of the most able technicians concerned with aviation, and as Chairman of the Royal Aeronautical Society for the past three years he has proved his ability to bring new life into what was apparently a moribund concern. N.F.S. has never been anything like moribund but it certainly has needed precisely the kind of vitality and enthusiasm which Colonel Sempill put into the R.Ae.S.

Sir Alan Cobham probably knows more than anybody in this country about developing the air sense, or, to use the current phrase, making people airminded. He has stirred up enthusiasm for British aviation all over the British Empire and since the last of his Imperial flights he has devoted himself to making Great Britain itself air-minded. His efforts have been equally successful whether with the Youth of Britain or with the City Fathers of our great municipalities.

To make N.F.S. a success methods very similar to those used by Sir Alan all over Great Britain are needed. Every shareholder in the concern and every member of the Hanworth Club and of the various other Clubs affiliated to Hanworth must become an enthusiast whose duty it must be to bring others into the fold. And Sir Alan is peculiarly fitted for this work.

Moreover in his capacity as consulting aerodrome engineer he has within the last few years acquired a vast store of knowledge which will be of immense value in locating, organising, and equipping N.F.S. aerodromes as and when they may be formed. He is in close touch with hundreds of municipalities all over the British Isles, and all the experience which he has acquired and will acquire in the development of aerodromes all over the country is bound to be of high value to N.F.S.

Statements in various papers have announced that fresh capital has been found to carry on the further development of N.F.S. An interesting statement was made in Parliament recently to the effect that money borrowed by N.F.S. from the Air Ministry on account of prospective subsidies, payable on pilots trained by N.F.S., had already at that date been repaid,—so evidently additional money was available some time ago.

One gathers unofficially that the new policy of N.F.S. is altogether on the right lines. Closer contact is to be maintained between headquarters and the various provincial centres so that local support for those centres may be increased. Local people of importance are to be induced to take a more lively interest in their various centres so as to bring together more closely the Directors of N.F.S., the members of the local Flying Clubs and the local business community.

Technical organisation will be directed towards doing more flying without increasing the number of aeroplanes or people employed. Undoubtedly the existing personnel are extremely good workers and nobody would suggest that they might have done more work than they have done. The idea rather is to find more work for them to do. Naturally the greater the amount of flying that can be done either training or joyriding or taxi work the greater will be the income for a given overhead charge.

There is considerable hope that the all-round effectiveness of N.F.S. may be considerably increased by co-operation with local efforts. All over the British Isles municipalities are beginning to realise that a local aerodrome is as necessary as a local railway station and that by contributing to the establishment of a local aerodrome, provided that the said aerodrome is linked with a national organisation such as N.F.S. which will assure a certain amount of regular traffic to that aerodrome, money will be well spent. If that contribution takes the form of providing suitable buildings in addition to the necessary land then the money is well spent in any case, as the municipality will have tangible assets for it.

The obvious sources from which income is to be derived are (A) Increased membership; (B) Increase in the amount of Club flying; (C) Increased subsidy earned by training more pilots; (D) Increased revenue from the housing and maintenance of private aeroplanes; (E) Development of taxi work and commercial flying generally; (F) Increased efficiency in technical organisation, and economy in operation, and (G) Reduction in overhead expenses.

During the past year in spite of the unsatisfactory financial results considerable steps have been made in all these directions. The total membership of clubs affiliated to N.F.S. is now close on 2,000. New members are continually joining, and the Hanworth Club itself with a total membership of over 1,000 is said to be biggest flying club in the World.

Over 250 members have actually been trained to fly at Hanworth and so far over 50 members have become private owners. In the six months ending at the end of October N.F.S. machines covered over 37,000 miles on taxi work and the company's prospects of increasing this class of work are naturally improved by the general increase of interest in air transport.

Another source of revenue which is likely to spread during the forthcoming year is what is called banner advertising. N.F.S. has acquired the British rights of the Blériot patent for this form of advertising and already valuable contracts have been placed.

Besides doing its best to influence municipalities to build properly equipped aerodromes, N.F.S. has inspected a number of sites for possible use merely as landing grounds for private aeroplanes and air taxies. Over one hundred of such sites have been selected in different parts of the country, and if approved by the Air Ministry they may be licensed for regular use. These should increase considerably the amount of flying, because at present both private flying and taxi flying suffer from the fact that although there are many places to which people would like to fly there are so many of these which have no landing places. The position is rather as if somebody had an excellent fleet of ocean-going steamers and there were no ports on which they could call.

When N.F.S. was originally formed the whole thing struck one as being altogether too grandiose in its conception. The initial idea of linking up a number of aerodromes all over the country through a central organisation was excellent. And the idea of having something in the nature of a country club at Hanworth was good in itself. But unfortunately the impression got about that N.F.S. were out to kill everybody else in the business and get a monopoly of private flying, largely by absorbing the various flying clubs in the Provinces.

Also, in some indefinable way, the whole tone of the place started by being wrong. Instead of being a hard-working flying establishment for the use of the moderately well-to-do middle classes who can afford to do some flying it gave the impression of that kind of would-be smartness which is usually associated with theatrical people, cinema stars and the slightly off-colour aristocracy which associates with them. And instead of getting paragraphs into the papers about the serious flying which was being done, the idea seemed to be to get the name of N.F.S. into the paper as a kind of appendix to the name of some individual who happened to be "in the news" at the time. In fact the whole thing had about it so much of the atmosphere of Fleet Street and the stage that the serious aviation people instinctively disliked it.

All that sort of thing is to be discountenanced in future and N.F.S. is apparently prepared to succeed or fail on the strength of its work as an organisation for the advancement of flying. Certainly from what one has seen of late things are shaping in the right direction. Considering the weather an immense amount of flying has been done re-

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cently at Hanworth and it has been done by serious-minded people who really want to fly.

In the earlier days of motoring we heard a great deal about popularising motoring for the man of moderate means. And I believe that the policy of N.F.S. is to popularise flying for the man or woman of moderate means. Visitors from the provincial clubs will find themselves heartily welcomed at Hanworth and will be able to find accommodation there for man and machine at reasonable prices. In fact the whole atmosphere of the place is now essentially workmanlike and calculated to attract the serious aviator.—

C. G. G.

## THE BIRD'S EYE VIEW.

The mapping of Rio de Janeiro, in spite of the recent revolution in Brazil, is going steadily on and will make Rio one of the best-mapped cities in the world when the contract of the Aircraft Operating Company Ltd., is finished some time in March. A photograph of the staff appears on page 1478.

The work is in charge of Mr. W. H. C. Whalley, and besides a staff of 23 Europeans engaged at home there are 120 native or naturalised Brazilians. Major Hemming, the Managing Director of the firm, says that the spirit of the expedition is the best possible, even though the naturalised members boast a good many nationalities.

The maps themselves are up to Ordnance standard, and the 1:1,000 and 1:2,000 scale maps of certain areas contain every tree and front doorstep besides intimate details of the backyards. Rio is built in a valley among big mountains on all sides, and the lower slopes are covered with small properties, so the difficulties and risks of the work are by no means negligible.

The success of air survey in general is gradually having its effect on governments of all nations, and their professional surveyors, and the latter are beginning to realise that survey from the air does not imply their own obsolescence but finds out easily and quickly where their methods may best be applied. When this truth is more widely realised the undercurrent of opposition to air surveyors in government circles may relax enough to let this new profession realise its possibilities, especially in colonies and dominions.

The Surveyor-General of Northern Rhodesia is a disciple of the modern school, and the rapid mapping of Northern Rhodesia by air is justifying him.

Incidentally, the gathering and training of an expert staff such as that of the Aircraft Operating Co. Ltd., is a service of tremendous value to the country in peace or war.

## AERIAL SURVEY IN AUSTRALIA.

The Mackay Aerial Survey Expedition returned from Central Australia to Adelaide on June 25, according to Australian accounts of that period. Mr. Donail Mackay reported that some important survey work had been done, including the charting of a newly discovered salt lake which he believed to be the largest in the interior.

Most of the work was done from the air, and only two landings were made away from the base, as the country was dangerous and ground organisation difficult because of sickness in the party.

## BUSINESS JOURNEYS.

Mr. Alan Muntz, of Airwork Ltd., Heston, who is in Egypt on business, arrived in Cairo on Dec. 30 in his Puss Moth after no worse adventure than a landing near Sitre in a sandstorm.

Mr. Neville Vintcent left Croydon on Dec. 28 in a Puss Moth on his way to Bombay. He reached Le Bourget the first day.

Mr. C. D. Barnard and Lord Lovelace, also in a Puss Moth, left Le Bourget on Dec. 28 on their way to Tanganyika.

Mr. A. M. Murad, a Bengali Moslem, left Karachi on Dec. 28 on the first stage of an attempted flight to Cape Town. He is competing for the £500 prize offered by the Aga Khan for the first solo flight by an Indian from India to the Cape. Mr. Murad is flying a Gipsy Moth.

The Hon. Mrs. Victor Bruce flew to Seattle, Wash., after leaving Victoria, B.C., and set out on Dec. 23 to fly to San Francisco. On this stage she was forced down by weather and landed in a thick mist. Her Bluebird was heavily loaded, which added to the difficulty, and a partial trip-up was the result. Mrs. Bruce sustained cuts on one leg and bruises on one arm.

In a telephone message to England on Christmas Day Mrs. Bruce said her hurts were not serious, and announced her intention of going on to San Francisco and Los Angeles in the New Year, and then across the United States to Louisville, where her mother is living. She will cross to Africa by boat and fly home.

## THE CAIRO—CAPE TOWN AIR SERVICE.

In the House of Commons on Dec. 17, in reply to a question by Mr. Day, the Under-Secretary of State for Air said that negotiations for the establishment of a regular air mail route between Cairo and the Cape of Good Hope had been completed and the agreement had been signed. The ground organisation was being developed with all possible speed and he expected that the northern section of the route, as far as Mwanza in Tanganyika territory, would be in operation at the end of February and the through service to Cape Town as soon as possible thereafter. The question of night flying was under consideration.

## BERLIN—BAGHDAD.

In 1931 the Deutsche Luft Hansa intends to inaugurate a direct mail route between Berlin and Baghdad. Mails will be conveyed from Berlin to Vienna by rail overnight and will be flown thence to Baghdad. The total time for the transport of the mails between the two cities will be 48 hours. From London to Berlin is about 6 hours' flying. From London to Baghdad is 4 days. Where is the balance?

For 1931 the Luft Hansa has ordered ten B.F.W. M.20 ten-passenger monoplanes (700 h.p. B.M.W. VIa engines), four Focke-Wulf A.38 monoplanes and two Dornier Wal flying-boats. Engines ordered are the 700 h.p. B.M.W. VIa water-cooled and the 550 h.p. Siemens Sh.20 air-cooled types.

MISS SPOONER'S RETURN.—Her reception at Wokingham by the Mayor.

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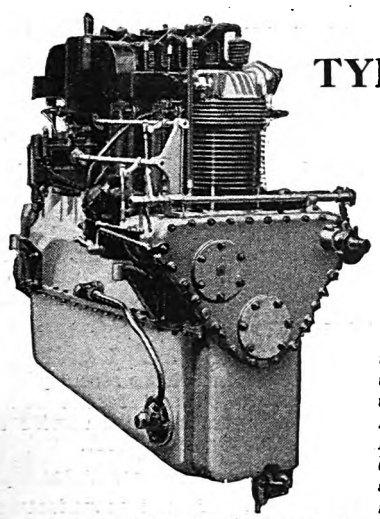

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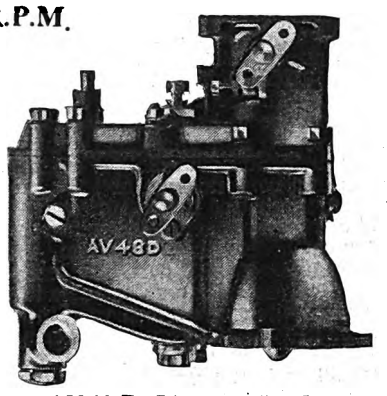


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## THE FAIREY AVIATION COMPANY, LTD.

The report of the directors of the Fairey Aviation Company Ltd., at its second ordinary general meeting on Dec. 22, showed a satisfactory situation. The meeting was held at Winchester House, Old Broad Street, E.C., with Mr. C. R. Fairey, Chairman and Managing Director, in the chair.

The report, and accounts, show that the period of business from Oct. 1, 1929, to Sept. 30, 1930, ended with a profit of £169,963. This amount included £9,617 interest on securities and discounts, and was £5,010 more than that of the same period for last year.

The firm's production shows a marked increase, and although prices have been reduced the loss has been compensated by improvements in manufacturing methods and equipment.

£21,000 is reserved for the redemption of debenture stock and £40,000 is written off the value of patents and licences, etc. A general reserve fund is started as from this year with a figure of £30,000. Income tax provision amounts to £127,000. The dividend payable to holders of Ordinary shares is seven per cent. free of tax, and these items still leave a balance to be carried forward. In view of the present depression and uncertainty the directors do not think a larger dividend advisable but consider that an increase of reserves and consolidation of the Company's financial position is in the better interest of share-holders.

One of the most satisfactory features of the statement is the foreign orders shown thereon, with the comment that the British Aircraft Industry is one of the few which can show an increasing export business in spite of rather higher prices than their rivals and very intense competition. The policy of the Air Ministry in fostering research and technical progress, and withdrawing the export restrictions on aircraft, has had much to do with the promising export position. Fairey aeroplanes for Belgium and Greece are among the most important orders, but other countries are also taking some.

The Air Survey Company Ltd. is operating satisfactorily and giving promise of paying its way. At present contracts for the Egyptian Government are in hand and well advanced.

The present period of depression prevents any costly adventures into the Civil Aviation field, but preparations are being made to do so when conditions improve. The Company's new aerodrome is in operation, but will not at present be made available for civil use because the Company has occasion to use it for testing machines which are on the secret list.

In conclusion Mr. Fairey said that the works are on full time with orders in hand and in prospect, and that the firm has shown its ability to meet foreign competition successfully, also that the excellent relations with the British Air Ministry are being maintained.

The report was adopted unanimously and without question.

## THE G.A.P.A.N.

The Court of the Guild of Air Pilots and Navigators for 1930-1 stands as follows:—

*Master*:—Vacant, owing to the death of Air Vice-Marshal Sir Sefton Brancker.

*Deputy Master*:—Sq. Ldr. the Rt. Hon. F. E. Guest, C.B.E., D.S.O.

*Honorary Wardens*:—Her Grace the Duchess of Bedford, D.B.E., Sir Alan Anderson, K.B.E., C. R. Fairey, Esq., M.B.E., F.R.Ae.S., Sq. Ldr. the Rt. Hon. F. E. Guest, C.B.E., D.S.O., Major Norman Holden, LL.B., The Rt. Hon. the Viscount Rothermere, The Baron Wakefield of Hythe, C.B.E., LL.D., Hon. F.R.Ae.S., The Rt. Hon. the Baron Weir of Eastwood.

*Wardens*:—A. G. Lamplugh, A.F.R.Ae.S., M.I.Ae.E., F.R.G.S., Norman Macmillan, M.C., A.F.C., A.F.R.Ae.S., C. R. McMullin, A. S. Wilcockson.

*Members of the Court*:—Flt. Lt. G. Birkett, Sir Alan J. Cobham, K.B.E., A.F.C., J. B. L. H. Cordes, H. D. Davis, A.F.C., Sq. Ldr. R. A. de Haga Haig, A.F.C., A.F.R.Ae.S., F. Dismore, Ordre Leopold II (Belgium), W. L. Hope, F. A. Jones, O. P. Jones, C. A. Pike, H. H. Perry, Col. the Master of Sempill, A.F.C., F.R.Ae.S., F. Tymms, M.C., Chevalier de l'Ordre de la Couronne, Croix de Guerre, A.F.R.Ae.S., L. A. Walters, The Rev. P. D. Robins, A.F.C. (Chaplain).

## CONCENTRATED SAFETY AT ORLY.

On Dec. 21, 1930 the *Congrès de la Securité* organised a practical demonstration of various safety devices at Orly. A dozen different types of machines were demonstrated, some of which relied on their normal design to defeat, or at least pardon, the errors of pilotage, others had slots, vanes, windmills, variable camber wings, etc. or used heavy oil, *essence de securité*, etc.

MM. Robert Morane and Michel Detroyat flew Morane-Saulnier monoplanes without safety devices but with perfect safety, M. Lemoigne flew a Potez 36 light cabin monoplane fitted with fixed slots along the entire leading-edge of the wings and M. Petit de Myrbech flew an A.B.C. Scorpion-engined monoplane fitted with a variable-camber wing devised by M. Lachassagne.

Senor de la Cierva presented his latest Autogiro with Armstrong Siddeley Genet engine and self-starting tail. M. Thoret, the indefatigable French "soarist" and uncrowned king of the Alps took the Autogiro up and made it soar over the roof of the Orly airship hangar.

Other exhibits included a Farman 190 fitted with the Constantin auxiliary stabiliser, a Farman Goliath with carburetters suited to the atomisation of the Ferrier *essence de securité*, a Morane-Saulnier with the Clerget heavy-oil engine, and two Farman monoplanes each fitted with the *patin anticapotant Fritsch*, a caterpillar type landing device, quick-emptying tanks, wheel brakes, fire-extinguishers, etc., also formed part of the demonstration.

## MORE ROOM AT STAG LANE.

The De Havilland Aircraft Co. Ltd., have recently enlarged the housing space for private owners' Moths and Puss Moths. The accommodation, with attentive service at the usual rates, is available for booking forthwith.

## AN ADDRESS TO BE NOTED.

Alexander Duckham and Co. Ltd., the manufacturers of the World-famous Adcol lubricating oils and other petroleum products, wish readers of The Aeroplane to note that they are moving into new offices and after the present date their address and telephone number will be as follows:—

Duckham House, 16, Cannon Street, London, E.C.4.
Telephone—Central 6246/9.

## A TOPICAL LESSON.

From Mr. Anon.

*Trader*: I can't understand why you failed in business."
*Ex-Trader*: "Too much advertising."
*Trader*: "What do you mean, too much advertising? You never spent a penny on advertising."
*Ex-Trader*: "That's true, but my competitors did."

## MANY INVENTIONS.

"Red port at night is a good man's delight, but green eyes of a morning are a wise man's warning," runs the ancient adage, and how true it has proved for many a poor mutt this festive season. Yuletide, we reflect mournfully, as we brush a dancing liver spot from before our eyes, is over, and as we watch the unsold turkeys being restored to cold storage for another year many of us wish we could lay our throbbing and distorted livers upon the ice beside the lucky birds for the same period. Maybe a great wave of bitterness (heartburn?) wells up within us as we reflect upon our lost opportunities. Did we, for example, kiss yon flapper beneath the broccoli bough or playfully slap Auntie athwart the neck with a bit of seasonable greenery in the shape of a stout young holly tree, and did we seize the chance of deluging our rich but repulsive relative, great Uncle Romulus, with brandy, and setting him afire with holly in his hair in lieu of the pudding? If not, we have failed lamentably, for what is sheer fun at Yuletide is avuncular arson, drunk and disorderly and a number of other things, punishable (like spitting) with a fine not exceeding five pounds at any other time of the year. Well! Well! next time we must do better, as the ton of mail said to the Argosy at Nuremburg, where we understand they had a jolly old-fashioned Xmas with lots of snow and rows of red, red robins roosting on the fuselage cheering on the perspiring crew with carols.

The proud boast of one Air Traffic Company, which states that no other company uses three and *four*-engined aircraft

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on the London-Paris route, has been amply vindicated by a correspondent, who writes that for some time he has eagerly swept the skies in vain through two pairs of horn-rimmed spectacles for these fabled four-engined aircraft, and only on Christmas Eve was he able to say with certainty that he had seen them on the Paris route. It happened that he was grog-bound Botley way on that occasion, owing to his car refusing to take a very steep hill, which afterwards turned out to be the side wall of a cottage, when he distinctly saw a couple of four-engined aeroplanes flying in close formation overhead, which so gratified his innate patriotism that he cheered hoarsely until he fell asleep. Official records seem to show that only one twin-engined Handley Page can have passed him at the time stated, but it only shows what faith and seasonable cheer can do, how wrong official records can be, and how seldom advertisements exaggerate.

In last week's AEROPLANE a headline said "Imperial Airways Figures," although it seems a little hard to draw attention to people's figures just at this season. Anyway, but for a number of squat ones and a bow-legged effect here and there, Imperial Airways figures are mostly very svelt. Which reminds us that a gentleman of that firm with an Adenoid-like (or would it be Adonis-like?) figure paid us a shrewdly back-handed compliment recently. Apparently he often travels on the India Mail, though why we do not know as not being a passenger he is not compelled to, and when thus enjoyably employed he says he always reads "Many Inventions" by which means he has known as many as two frontiers slip past unobserved. Now, what would you have said to that? What we said was something to the effect that we wrote for the literary-minded highbrow, and if he wanted a sleeping-draught why did he not see a chemist about it, because if we started an infallible cure for insomnia, probably the Editor could be prosecuted under the Noxious Drugs Act. We do not know yet if that was the right answer, but we suppose so, as the gentleman seemed quite stunned by it.

A new club has started on the Aerodrome of which the President, Hon. Sec. and Treasurer shall be nameless for very shame. It is called the Aerodrome Island Club and the qualifications are to have struck an island or refuge with a motor-car between the front wheels head on at a speed of over 10 m.p.h. Members must have been uninsured at the time of impact. The objects of the club are to get a reduction for quantities on the retail price of islands, to form a police corruption fund to elect a hospital visiting committee and to petition for india-rubber lamp-posts. Whether a skipper of a sprat smack who strikes one of the Outer Hebrides is eligible for membership, and if a pilot who lands on Whale Island in a "Hannibal" thus pushing that artificial aid to Nautical training under water can join the club and again if an honorary Grand Slamship is awarded to one who buys a second-hand tank and pushes the Piccadilly Island over are questions which are not yet settled but upon which there will doubtless be a Wardmote quite shortly.

And now for New Year resolutions, Chaps! Most of us have not got further in this line than vowing a candle to be burnt both at the hither and nether end to St. Aspirin and promising to love and honour St. Doan (the backache kidney miracle worker) and to obey the gospel according to St. Eno as written in fair and clerkly hand on the fruit salts tin (adults two soup ladles to an egg cup of water), but anyhow this is a step in the right direction and a far, far better thing than soaking the time fuse of a cracker in sherry and chewing it thus becoming a menace at parties, as some we could mention are inclined to. Let not the spirit of gaiety bubble up beyond the collar studs, back and front, for these form Nature's plimsol lines beyond which it is unwise to effervesce. With which trifling horal momily—we beg pardon—moral homily we will part from you, hoping this finds you as it leaves us, not altogether in the pink.

—SPRY.

## RECEIVERSHIPS (APPOINTMENT OR RELEASE).

AEROPLANE SERVICES LTD.—P. A. Pettefer, of 16, Yardley Road, Acocks Green, Birmingham, ceased to act as Receiver and Manager on Dec. 18, 1930.

THE AIRSHIP DEVELOPMENT COMPANY LTD.—T. Froude, C.A., of 1, Queen Victoria Street, E.C.4, was appointed Receiver and Manager on Dec. 3, 1930, under powers contained in debentures dated Oct. 29, 1929, and April 7, 1930.

## NEW COMPANIES.

ROADWAYS AND AIRWAYS LTD.—Private company. Registered Dec. 22. Capital, £10,000 in 8,000 10% cumulative participating preference shares of £1 and 40,000 ordinary shares of 1s. each. Objects: To carry on the business of transporters of persons, goods or otherwise by land, sea or air, etc. The subscribers (each with one ordinary share) are: H. W. Sale, 41, Holland Road, Kensington, W.14, technical photographer. R. F. Sheppard, 140, Cholmley Gardens, N.W.6, C.A. H. W. Sale is the first director. Qualification: £100 shares. Remuneration: As fixed by the company. Registered office: Holborn Viaduct House, 12, Holborn Viaduct, E.C.1.

## PERSONAL NOTICES.

### BIRTHS.

BAYLEY.—On Dec. 17, at Ashburton Cottage, Weybridge, to Enid Care, wife of Wing Cdr. R. M. Bayley, R.A.F., Imperial Defence College—a son.

BUTTON.—On Dec. 18, at a nursing home in Southsea, to Evelyn, wife of Alfred Hugh Button, Plt. Off., R.A.F.—a daughter.

HAMMOND.—On Dec. 17, at Cairo, to Marjorie, wife of Alfred Vavasour Hammond, Flg. Off., R.A.F.—a son.

SIMPSON.—On Christmas Day, at Worthy Down, Winchester, to Winifred Elsie (*née* Benson), wife of Sq. Ldr. J. H. Simpson, R.A.F.—a son.

WINCOTT.—On Dec. 26, at 9, Burlington Road, Ipswich, to Marjorie Anne (*née* Cramer Roberts), wife of Flt. Lt. C. B. Wincott, R.A.F.—a daughter.

### FORTHCOMING MARRIAGES.

CLARE—GUNSON.—The engagement is announced between Maurice Howard Clare, R.A.F., only son of Mr. and Mrs. R. M. Hankinson, of Wellington, New Zealand, to Elma Victoria Anne, elder daughter of Mrs. Gunson and of the late George Gunson, of Freshfield, Lancashire.

GAIRDNER—WALKER.—The engagement is announced between Flt. Lt. William Dalrymple Gairdner, D.F.C., R.A.F., younger son of the late C. A. Gairdner, and Ann, youngest daughter of the late Capt. F. M. Walker, R.N., and Mrs. Walker, of 3B, Maida Hill West, London, W.2.

### MARRIAGES.

CHAMBERLAIN—KEDWARD.—On Dec. 22, at St. Martin-in-the-Fields, Flt. Lt. George Philip Chamberlain, R.A.F., elder son of Mr. and Mrs. G. A. P. Chamberlain, of Enville, Stourbridge, to Alfreda Rosamund, younger daughter of Mrs. Florence Kedward and the late F. M. Kedward, of Belmont, Swingfield, near Dover.

COCHRANE—WIGGIN.—On Dec. 22, in London, Sq. Ldr. the Hon. R. A. Cochrane, A.F.C., R.A.F., youngest son of Lord and Lady Cochrane of Cults, to Miss Hilda Frances Holme Wiggin, third daughter of the late Mr. and Mrs. Francis H. Wiggin.

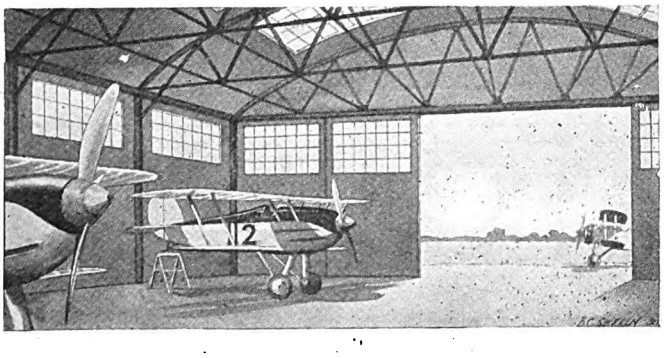
THOMAS—MACGEORGE.—On Dec. 27, Flt. Lt. Harold Thomas, R.A.F., to Margaret Joyce, daughter of Lieut.-Col. J. B. MacGeorge, R.E. (retd.), of Torquay.

### DEATHS.

HANLON.—On Dec. 25, in 'Iraq, as the result of injuries received in a flying accident on Sept. 3, 1930, Charles Peter Hanlon, Flg. Off., R.A.F.

Mr. Hanlon, who was the son of Mr. T. P. Hanlon, of Southsea, and a brother of Mr. J. A. T. Hanlon, the Olympic long-distance runner, entered the R.A.F. with a Short-Service Commission in April 1928. After a course of flying instruction at No. 5 Flying Training School, Sealand, he was posted to No. 43 (Fighter) Squadron. In March 1930 he was posted to No. 30 (Bomber) Squadron, Mosul, and was serving with that Unit at the time of the accident which resulted in his death.

WILLIAMS.—On Dec. 1, after a long illness, the result of injuries received on duty in November 1918, while serving with the Women's Royal Air Force, Jessie Edith Williams, formerly Assistant Administrator, W.R.A.F., Seaplane Station, Fishguard.

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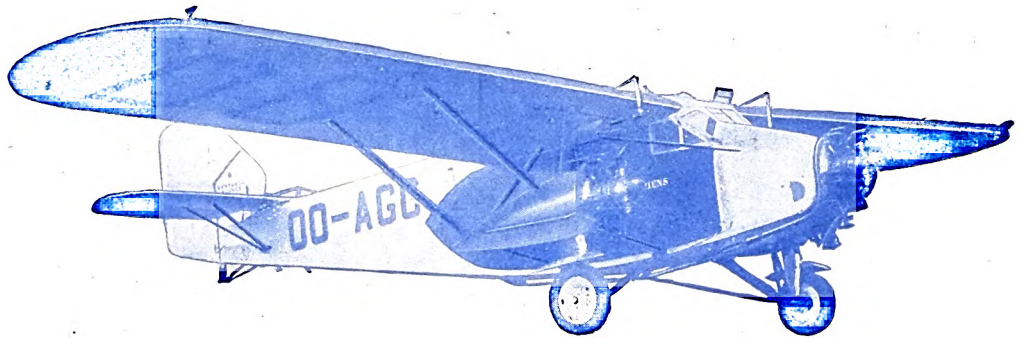


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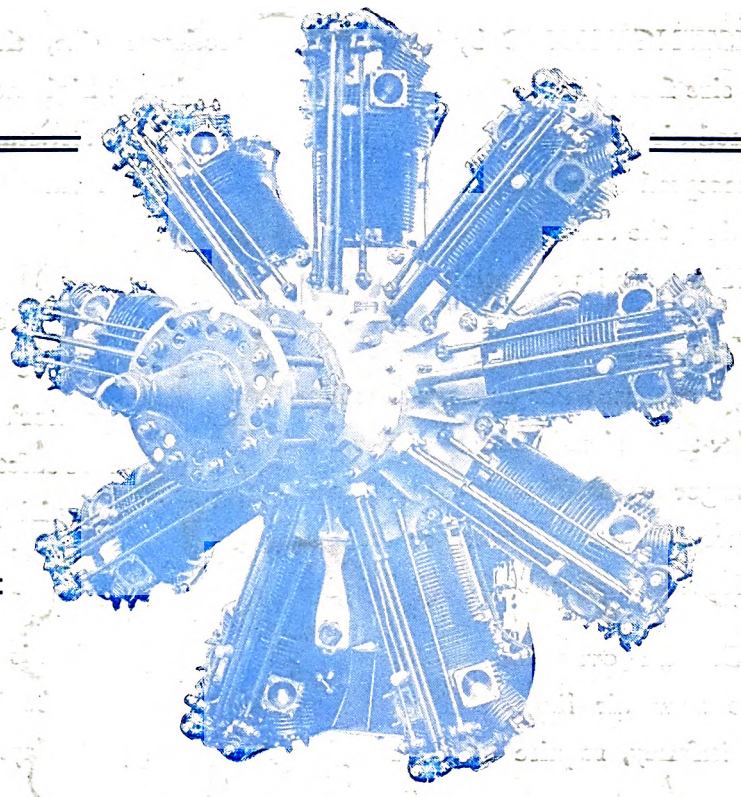

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